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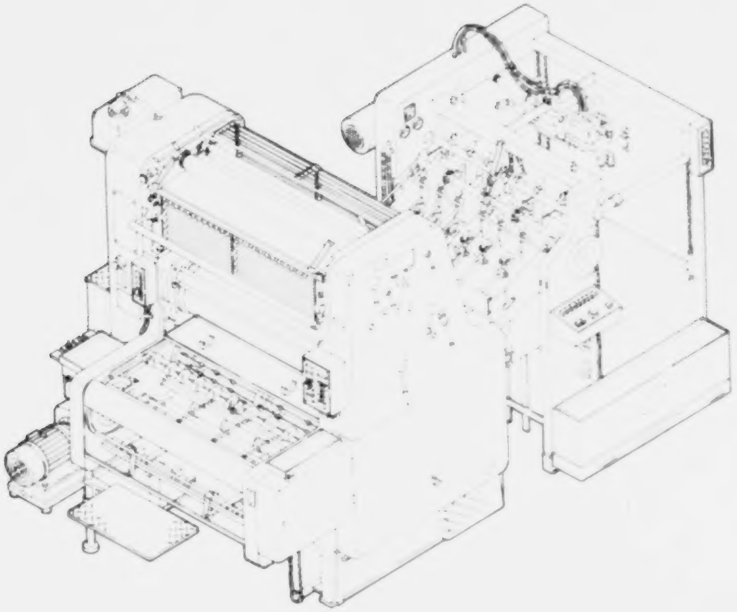
TM 5-3610-286-20

ORGANIZATIONAL MAINTENANCE MANUAL



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TOPOGRAPHIC SUPPORT SYSTEM
PRESS SECTION PRINTING PRESS
MODEL SOR
NSN 3610-01-214-1245

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HEADQUARTERS, DEPARTMENT OF THE ARMY

9 MAY 1988

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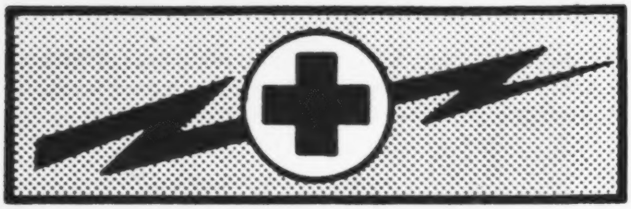
WARNING



HIGH VOLTAGE

- Do not operate printing press until you are sure TSS Press Section is connected to a suitable ground. Failure to observe this warning may result in death or serious injury.
- Shut off power source before attempting to disconnect, service, or connect wires or cables. Failure to do so may result in death or serious injury.
- When working on high-voltage components, always have an additional person present, and keep one hand away from equipment to reduce hazard of current flowing through vital organs of body. Remove all jewelry from fingers, wrists, and neck prior to working on electrical components. Failure to do so may result in death or serious burns.

WARNING

ELECTRICAL HAZARDS

- ELECTRICAL SHOCK. Static electricity is retained in static eliminator bar for up to two hours after power is turned off. Touching static eliminator bar while charged may result in injury from electrical shock.
- Hazardous electrical voltages exist within printing press. Do not connect or disconnect any electrical components while power is on. Death, serious electrical shock, or burns may result.

WARNING

OPERATIONAL HAZARDS

- EXPOSED MOVING PARTS. Do not inch printing press and wipe cylinders at the same time. Return printing press to SAFETY STOP after each inching. Failure to do so may result in serious injury.
- EXPOSED MOVING PARTS. All adjustments will be made while printing press is on SAFETY STOP except those authorized by this manual to be made with printing press running. Printing press must be on safe at all times when not in motion. Always shout "clear" and wait for "clear" response before taking printing press off safe to inch or run. Failure to follow this warning may result in serious injury.

WARNING

OPERATIONAL HAZARDS (CONT)

- EXPOSED MOVING PARTS. Remove all jewelry. Keep shirts tucked in, sleeves above elbows, and ties removed. Failure to observe these precautions while operating printing press may result in serious injury.
- HIGH NOISE LEVEL. Hearing protection must be worn while operating printing press. Failure to do so may result in hearing impairment.

For detailed printing press safety procedures, refer to TM 5-245.

For first aid procedures, refer to FM 21-11.

WARNING

MAINTENANCE PROCEDURE HAZARDS

- COMPRESSED AIR. Compressed air used for blowing away chips, dirt, etc., must leave nozzle at less than 30 psi (207 kPa) to prevent personal injury. Be certain that nozzle is rated to provide a maximum of 30 psi (207 kPa). Be sure to wear safety goggles or lenses when using compressed air. Compressed air and particles moved by compressed air can cause damage to your eyes.
- CLEANING SOLVENT. Lithographic solvent is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat. If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

TECHNICAL MANUAL

NO. 5-3610-286-20

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, 9 MAY 1988

Organizational Maintenance
Manual
for
TOPOGRAPHIC SUPPORT SYSTEM
PRESS SECTION PRINTING PRESS
MODEL SOR
NSN 3610-01-214-1245

Approved for public release; distribution is unlimited.

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual direct to: Commander, U.S. Army Troop Support Command, ATTN: AMSTR-MCTS, 4300 Goodfellow Blvd., St. Louis, MO 63120-1798. A reply will be furnished directly to you.

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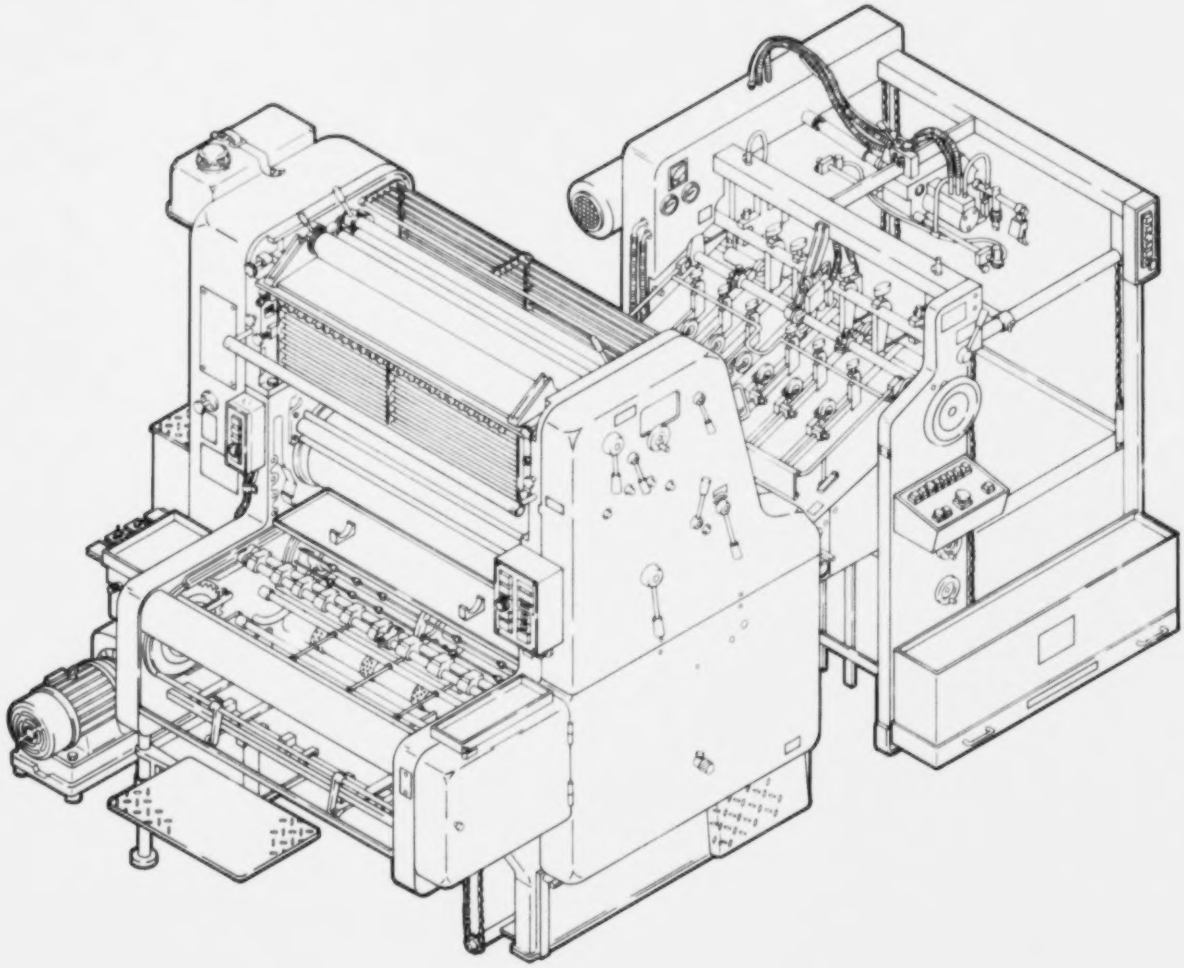

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Figure 1-1. Topographic Support System Press Section Printing Press.

CHAPTER 1

INTRODUCTION

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OVERVIEW

This chapter contains general information pertinent to the printing press and its components to enhance understanding of how it functions.

Section I. GENERAL INFORMATION

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1-1. Scope. This manual contains organizational, direct support, and general support maintenance instructions for the Topographic Support System (TSS) Press Section printing press Model SOR, NSN 3610-01-214-1245. Operating and operator's maintenance is contained in TM 5-3610-286-10. Repair parts and special tools for the printing press are listed in TM 5-3610-286-20P. For lubrication instructions for the printing press, refer to LO 5-3610-286-12. The TSS Press Section printing press provides printing support for topographic units. The printing press must be housed in a temperature- and humidity-controlled environment with access to electrical power and water supply. Operating and operator's maintenance instructions for the TSS Press Section that houses the printing press are contained in TM 5-3610-287-10. Organizational, direct support, and general support maintenance instructions for the printing press section are contained in TM 5-3610-287-24. Repair parts and special tools for the press section are listed in TM 5-3610-287-24P. For lubrication instructions for the press section, refer to LO 5-3610-287-12. The press section is mounted on a flatbed semitrailer chassis. Operating and maintenance instructions for the semitrailer chassis are contained in TM 5-2330-305-14. In case of conflict with the contents of any referenced document, the contents of this manual will be followed.

1-2. Maintenance Forms and Records. Department of the Army forms and procedures for forms used for equipment maintenance will be those prescribed by DA PAM 738-750, The Army Maintenance Management System (TAMMS).

1-3. Destruction of Army Materiel to Prevent Enemy Use. For general destruction procedures for this equipment, see pages 3-45 thru 3-50, STP 5-83F24-SM-TG, Photolithographer Soldier's Manual and Trainer's Guide.

1-4. Preparation for Storage or Shipment. The printing press must be coated with cosmoline if removed from the press section. Prepare for movement in accordance with TM 5-3610-286-10 prior to storage or shipment.

1-5. Reporting Equipment Improvement Recommendations (EIRs). If your printing press needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you do not like about your equipment. Let us know why you do not like the design or performance. Put it on an SF 368 (Quality Deficiency Report). Mail it to us at: Commander, U.S. Army Troop Support Command, ATTN: AMSTR-QX, 4300 Goodfellow Boulevard, St. Louis, Missouri 63120-1798. We will send you a reply.

1-6. Warranty Information. The TSS Press Section printing press and its parts are warranted by Heidelberg East for one year after installation into the section. Warranty starts on the date found on DA Form 2408-9, shipped with printing press section. Report all defects in material or workmanship to your supervisor who will take appropriate action.

Section II. EQUIPMENT DESCRIPTION AND DATA

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1-9. Equipment Data 1-13

1-7. Equipment Characteristics, Capabilities, and Data. The TSS printing press is a stream fed, offset lithographic press. Electrical and mechanical systems, which make up the press, work together to perform the printing process. Refer to TM 5-3610-286-10 for general equipment characteristics, capabilities, and data.

1-8. Location and Description of Major Components. The electrical and mechanical systems that function in the press are not always components of the same assembly. The press is constructed of two large side plates, one on the operator's side (O/S) and one on the drive side (D/S). The majority of the assemblies, subassemblies and components are mounted on the outside of each plate and covered by a guard, or mounted in, or between the plates. Items that are physically or functionally linked may not necessarily be mounted together or in the same manner. Components that are physically mounted on the feeder may be linked electrically or by air or vacuum hoses to press-mounted components.

a. *Functional Groups.* Data on the TSS printing press has been organized into seventeen functional groups to aid understanding of operation and to facilitate maintenance. These groups are listed in table 1-1 and identified in figures 1-2 and 1-3.

Table 1-1. TSS Printing Press Functional Groups.

Group	Group Components
01 Solution Container (1, figure 1-2)	Solution container, tube assembly
02 Main Guard (2, figure 1-2)	Main guard (D/S), upper and lower guards (O/S) and guard components
03 Inking (1, figure 1-3)	Inking rollers, ink fountain, components and mechanisms that drive the rollers
04 Dampening (3, figure 1-2)	Dampening rollers, dampening fountain, and mechanisms that drive the rollers

Table 1-1. TSS Printing Press Functional Groups (CONT).

Group	Group Components
05 Plate Cylinder (2, figure 1-3)	Plate cylinder, gears, plate clamp, register scope, cover plate assembly
06 Register (4, figure 1-2)	Pull rails, pull side lays, front lays, suction valve assembly and motor, shaft assembly
07 Delivery (3, figure 1-3)	Gripper system, suction slowdown assembly, pile lift motor, and various stops, sprocket drives and related mechanisms
08 Ranger Drum (5, figure 1-2)	Ranger drum shaft assembly, cam shaft assembly, electromagnetic switch
09 Impression Cylinder (6, figure 1-2)	Impression cylinder assembly, control mechanism, engaging lever and latch assembly
10 Blanket Cylinder (4, figure 1-3)	Blanket cylinder assembly, spindle and bearing bolt assembly and related mechanisms
11 Main Lubrication System (5, figure 1-3)	Valve, pump, lubrication heads, oil reservoir (gear box)
12 Main Motor and Drive (7, figure 1-2)	Main motor, V-belt
13 Transfer Drum (6, figure 1-3)	Transfer drum, drum wheels
14 Feeder (7, figure 1-3)	Suction head, pile lifting motors, sheet feeder mechanisms, static electricity eliminator
15 Compressor (8, figure 1-2)	Two models: oil lubricated or dry
16 Electrical (9, figure 1-2 and 8, figure 1-3)	Operating and monitoring controls, fuses, circuit breakers, contactors
17 Control Register System (not part of printing press)	Prepares printing plates for mounting in press

b. Component Descriptions. Components described below are organized as they appear in Appendix B, Maintenance Allocation Chart. These are the components for which organizational level maintenance is performed.

1-8. Location and Description of Major Components (cont).

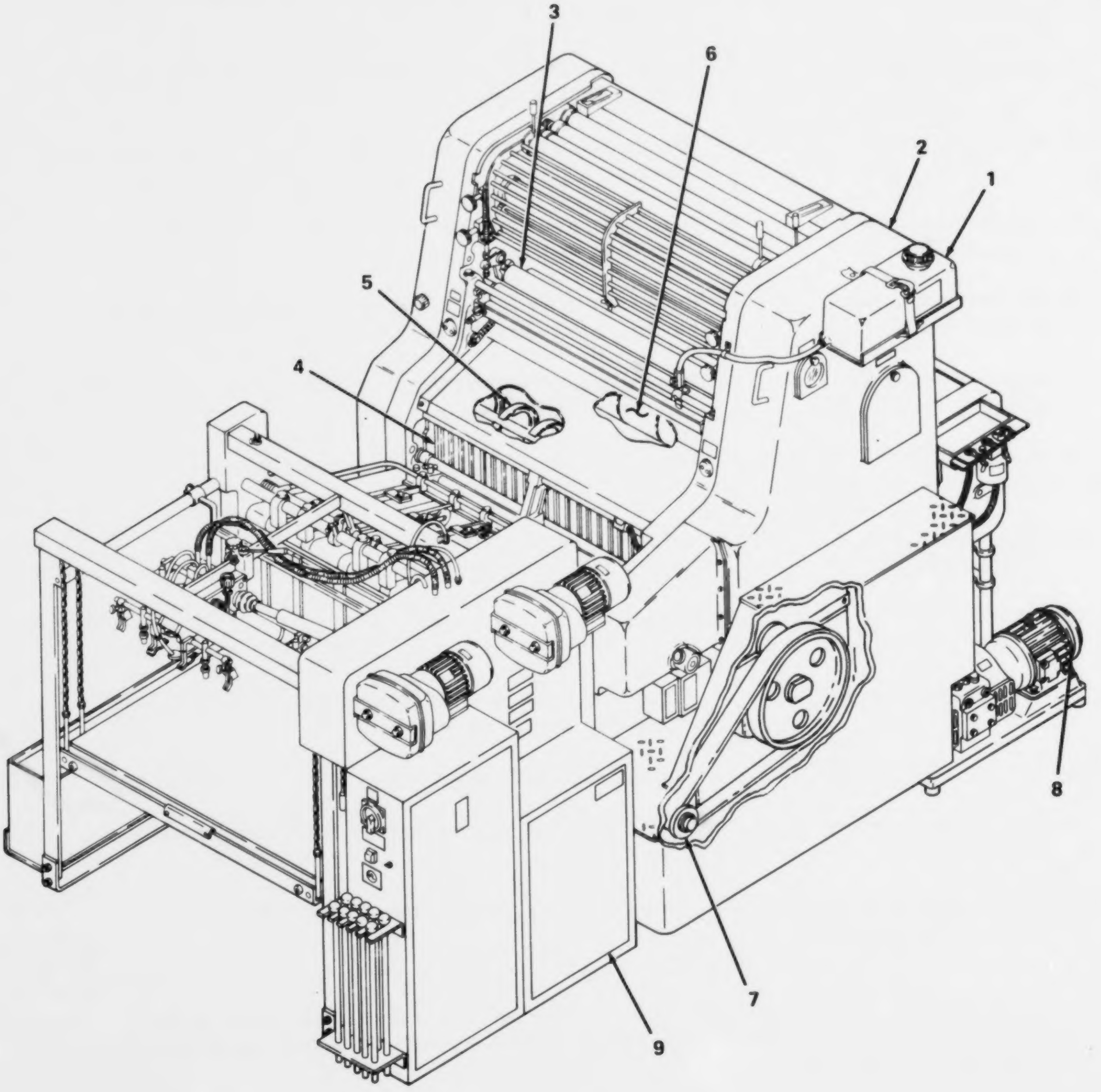

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Figure 1-2. TSS Printing Press, Drive Side (D/S).

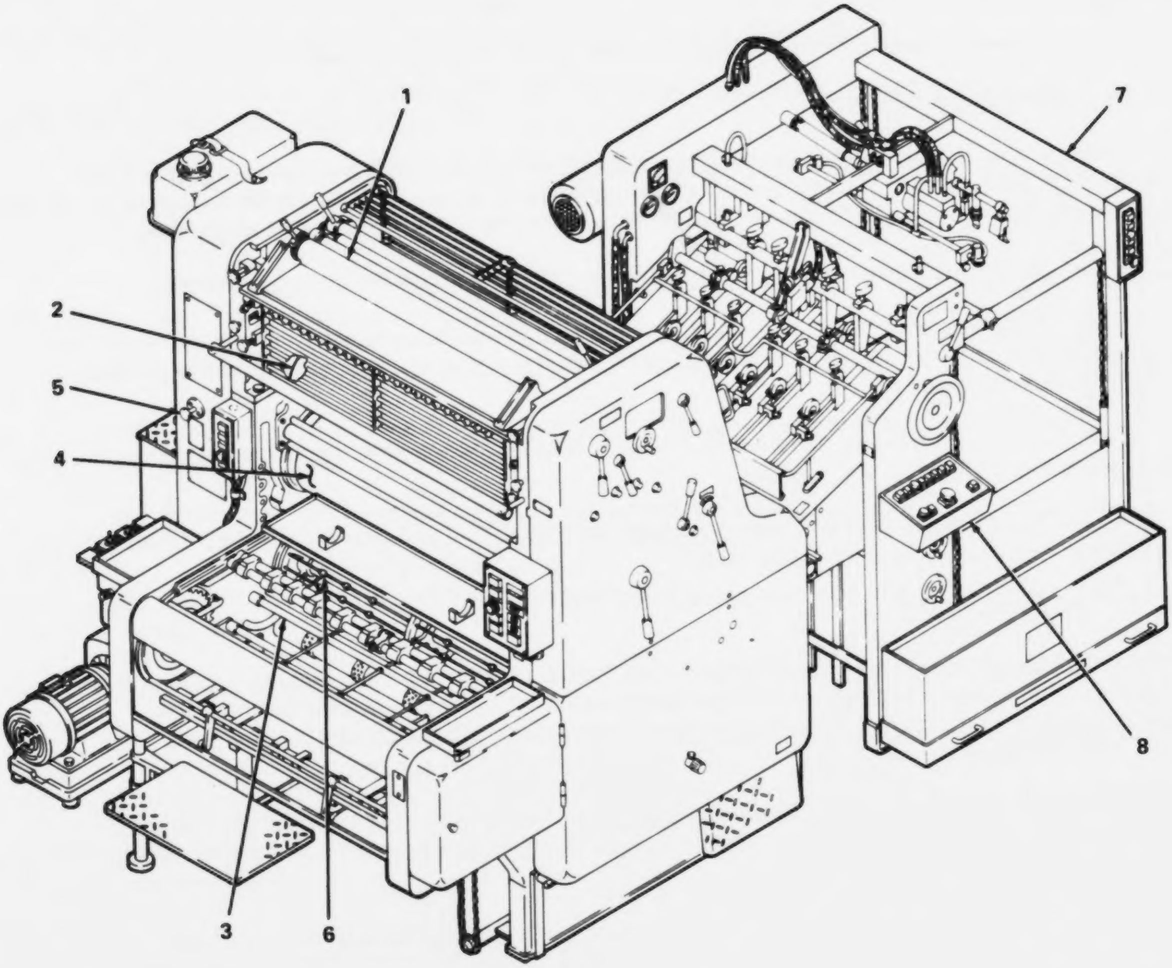

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Figure 1-3. TSS Printing Press, Operator's Side (O/S).

1-8. Location and Description of Major Components (cont).

(1) *Solution container group (01).*

(a) *Tube assembly.* Located on D/S frame. Regulates flow of fountain solution from solution container to fountain tray through a hose and valve.

(b) *Solution container assembly.* Contains mixture of plate etch and water used to dampen the plate.

(c) *Container shelf assembly.* Located on main guard. Shelf holds solution container.

(2) *Main guard group (02).*

(a) *Inking fountain guard.* Covers inking rollers. Associated safety switch automatically cuts power to the printing press if guard is opened while printing press is running. This prevents injury to personnel and damage to press components. Guard must be closed before operation can continue.

(b) *Belt guard.* Covers main motor drive belt and flywheel to prevent injury to personnel.

(c) *Upper guard and accessories (O/S).* Covers control mechanisms for cylinders and inking and dampening assemblies. Provides access for removal and adjustment of selected ink rollers and for cylinder adjustments.

(d) *Lower guard and accessories (O/S).* Covers control mechanisms, timing cams, and delivery assembly controls.

(e) *Main guard assembly.* Covers drive side gears adjacent to inking roller assembly. Also serves as a mount for container shelf assembly.

(3) *Inking group (03).*

(a) *Manual inking roller.* Located behind ink fountain on top of printing press. Functions as a vibrator roller during normal operation. Can also be used during an ink color change on short runs when main ductor is locked off. This saves washing the entire fountain by applying another color directly to the inking assembly.

(b) *Inking roller.* Located at top of press between frames. Moves ink from ink fountain to plate. Ink is metered using a combination of hard and soft rubber rollers to smooth and distribute ink evenly to the plate.

(c) *Form rollers limit switch.* Located on operator's side frame. Protects form rollers by preventing printing press operation if form rollers are not properly seated and locked into form roller journals.

(d) *Ink fountain assembly.* Located on top of printing press on delivery end. Consists of an ink reservoir; a large, flat blade; keys; and a roller. Adjustable keys regulate ink flow between fountain roller and ductor roller blade. Turning keys increases or decreases ink flow.

(e) *Wash up container assembly removable item.* Mounted on the inking assembly frame when in use. Consists of a long, rubber blade attached to long, trough-shaped catch pan. Used during wash up procedures. Acts as squeegee when cleaning solvent is sprayed on rollers and printing press is run at wash-up speed. Stored in container on feeder O/S when not in use.

(f) *Roller guide rail assemblies.* Located inside both drive and operator's side frames. Hold rider rollers in ink unit.

(g) *Oscillator lever assemblies.* Located behind guard on drive side of printing press. Control lateral movement of oscillator rollers through a series of levers driven by driving mechanism.

(h) *Swivel lever assemblies.* Located on operator's side frame behind upper guard. Contain form roller journal boxes and aid in positioning form rollers to plate cylinder.

(i) *Journal box housing assemblies.* Located inside operator's and drive side frames. Contain journal boxes and adjusting mechanisms and control form rollers' position.

(j) *Driving mechanism.* Located on drive side frame. Supplies mechanical power to oscillator rollers and oscillator lever assembly.

(k) *Vibrator roller bearing assembly.* Located on operator's and drive side frames. Holds inking vibrator roller. During operation, vibrator roller bearing shaft is controlled by a cam and pull rod in driving mechanism.

(l) *Roller adjusters and feeler rods.* Located on operator's and drive side frames. Roller adjusters are worm gears which position the form rollers by moving journal box housings. Feeler rods are spring-loaded rods that rest in journal box housing on drive side of printing press. They are used to adjust for the bounce of the form roller as it paces the clamp on plate cylinder.

(m) *Ductor roller swing mechanism.* Located on operator's side frame behind upper guard. Controls amount of dwell in ink fountain roller.

(n) *Upper oscillator roller and bearing.* Located between manual inking roller and ink ductor roller. Controlled by driving mechanism and oscillator lever assembly.

(o) *Distributor roller latch assembly.* Located on side frames. Holds manual inking roller in place during operation.

(4) *Dampening group (04).*

(a) *Dampening rollers.* Located between side frames. Five rollers move dampening solution in metered amounts from dampening fountain to printing plate clamped to plate cylinder.

(b) *Vibrator roller and bearing assembly.* Located between dampening fountain and oscillator roller. Movement of this dampening roller is controlled by dampening cam lever through use of a shaft and spring rods.

(c) *Engaging lever assembly.* Located on drive side frame behind main guard. Positions dampening rollers for impression-ON operation.

(d) *Dampening fountain assembly.* Dampening fountain is held in position on feeder end of press by guide pieces on both side frames. Holds dampening solution supplied from solution container.

(e) *Dampening oscillator bearing assemblies.* Located in operator and drive side frames. Hold dampening oscillator roller and control its movement through oscillator lever assembly and driving mechanism.

1-8. Location and Description of Major Components (cont).

(f) *Disengaging shaft assembly.* Located between fountain roller and oscillator roller of dampening group. Controls form rollers' position for installation and removal.

(g) *Swivel lever assemblies.* Located on oscillator roller bearings. House form roller journals. Controlled by disengaging shaft assembly.

(h) *Bearing bolt assemblies.* Located on operator's and drive side frames. Hold dampening fountain roller. Operator's side bearing also acts as driving mechanism and metering device for dwell of fountain roller.

(i) *Disengaging assembly.* Located on operator's side frame. Disengaging device for dampening form rollers.

(5) *Plate cylinder group (05).*

(a) *Swing gear.* Located on drive side of plate cylinder. Main driving gear for driving mechanism which runs inking and dampening groups. Contains an adjustment indicator for positioning of plate cylinder swing.

(b) *Plate cylinder.* Located between side frames. Holds plate for printing operations. Houses plate clamp and register scopes on its face.

(c) *Cover plate assembly.* Located on operator's side of plate cylinder. Reduces end-play of plate cylinder. Consists of needle bearing, shims, and cover plate.

(d) *Plate clamp.* Located on plate cylinder face. Clamping device for lithographic plate.

(e) *Register scope.* Located on plate cylinder face. Positioning device for lithographic plates.

(6) *Register group (06).*

(a) *Suction valve housing assembly.* Located under front lay assembly on feeder end of press. Supplies slight suction on lead edge of paper sheet to hold it in position at front lays. Motor and vacuum pump housing is located under feeder tape table and mounted on feeder.

(b) *Pull side lay assembly.* Located on the register table. Works with pull rail assembly to control sheet alinement for registration purposes. It is operated by cam and spring rod on drive side frame.

(c) *Pull rail assembly.* Located under register table. Operates with pull side lay assembly to control sheet registration. Two levers and cam shaft control pull rail operation.

(d) *Cam shaft assembly.* Located under register table. Controls all operations performed by pull rails and front lays. It also controls gripper operation of ranger drum.

(e) *Front lay assembly.* Located at front of register table. Controls sheet prior to pick-up by ranger drum. Light barriers send signals to electronic control box to ensure proper sheet alinement during printing operations. Front lays aid in holding and alining sheets prior to pick-up by ranger drum.

(7) *Delivery group (07).*

(a) ***Dust catcher assembly.*** Located under tool tray on drive side frame. Filters air from suction slow-down wheels before it gets to compressor.

(b) ***Delivery light assembly.*** Located under delivery plexiguard. Lights delivery pile area.

(c) ***Sheet stop assembly.*** Located on both side frames at delivery end. Controls side-to-side stacking of delivery pile through a cam and lever system. It is run by sprocket of delivery grippers chain.

(d) ***Blower tube assembly.*** Located below delivery plexiguard. Provides downward air blast to sheets as they pass into delivery area. Aids in controlling and stacking sheets after release by delivery grippers.

(e) ***Gripper system assembly.*** Located in the delivery area. Chain-driven system containing three gripper bars. The gripper bars pull printed sheets as they travel from impression cylinder to delivery pile. Grippers are opened and closed by cams and cam levers at points within the delivery area.

(f) ***Suction slowdown assembly.*** Located under main cylinders of press in delivery area. Slows down sheets entering delivery area. Suction slowdown wheels are supplied suction air from the compressor and are rotated by the suction drum motor.

(g) ***Suction drum limit switch.*** Located under suction drum assembly. Safety device to prevent paper pile from being raised too high and causing damage to the printing press.

(h) ***Chain sprocket assembly.*** Located on drive side frame of delivery area. Drives tachodynamo during printing press operation. Also serves as guide for gripper system chain.

(i) ***Cam lever assembly.*** Located on side frames of delivery area. Controls movement of sheet stops.

(j) ***Trip block assembly.*** Located at front of delivery area. Block assembly works with a limit switch to stop all printing press operations when sheets overshoot delivery area.

(k) ***Pile lifting motor assembly.*** Located under main press cylinders on drive side frame. Raises and lowers delivery pile through a system of chains and gears.

(8) *Ranger drum group (08).*

(a) ***Cylinder safety guard assembly.*** Located above the ranger drum and impression cylinder. Protects against injury to personnel and damage to printing press.

(b) ***Cam shaft assembly.*** Located in side frames below ranger drum. Controls gripper bar as it comes to register table to pick up sheets.

(c) ***Ranger drum shaft assembly.*** Located in ranger drum. Holds ranger drum components together and has a driving gear on the drive-side frame.

(d) ***Electromagnetic switch.*** Located on operator's side frame behind lower guard. Controls ranger drum gripper operation through a cam and lever system. This system either locks grippers or allows them to function.

1-8. Location and Description of Major Components (cont).

(9) *Impression cylinder group (09).*

(a) Impression cylinder control mechanism. Located on operator's side frame behind upper and lower guards. Controls impression ON/OFF modes of the printing press. An electromagnet controls a series of levers which control position of blanket cylinder to impression cylinder.

(b) Impression cylinder assembly. Located behind the ranger drum. This gear-driven cylinder has grippers which are opened and closed by a cam to grip blank sheets of paper. Impression cylinder receives sheets from ranger drum. The paper wraps around the impression cylinder, which presses it against blanket cylinder. The paper is then passed on to delivery grippers.

(c) Engaging lever latch assembly. Located on drive side frame behind guard and shelf assembly. Latch locks system for impression-ON operation.

(10) *Blanket cylinder group (10).*

(a) Spindle and bearing bolt assemblies. Located on both sides of the blanket cylinder. Controls the blanket-to-impression cylinder pressure for printing. Contains a cam system which positions blanket cylinder close to or further from impression cylinder as operator adjusts spindle.

(b) Deflector assembly. Located between plate and blanket cylinders. This safety device, when tripped, stops all printing press functions. This prevents personnel injuries and damage to cylinders.

(c) Safety limit switch. Located behind upper guard. Trips off printing press when deflector is moved. Operates through cam which is attached to deflector assembly.

(d) Blanket cylinder assembly. Located below plate cylinder. Houses blanket clamps which hold blanket in position. This gear-driven cylinder is adjustable to impression cylinder through the spindle and bearing bolt assembly.

(e) Cover plate assembly. Located on operator's side of blanket cylinder. Reduces end play of blanket cylinder. Consists of needle bearing, shims, and cover plate.

(f) Blanket clampshaft and bearing assembly. Located on operator's side of blanket cylinder bearer. Consists of a bearing housing and worm gear which control blanket clamp movement.

(11) *Main Lubrication System (11).*

(a) Gear box assembly. Located on drive-side frame behind flywheel. Main driving unit of printing press. It houses main driving gear, oil resevoir, oil filter, and oil pump.

(b Lubrication distribution system. Located throughout the printing press. Consists of a manually operated valve, numerous oil distributors and oil lines. These lubricate bearings, gears, cams, and levers when valve is operated.

(12) *Main motor and drive assembly (12).*

(a) Main motor. Located under feeder tape table between feeder and printing press. Electric motor provides main drive power for cylinders, rollers, and suction head.

(b) V-belt. The V-belt is connected between the main motor and flywheel. This mechanical link transmits torque from the main motor to printing press driving gears.

(13) Transfer drum (13). Located below impression cylinder. Transfer drum (skeleton cylinder) aids smooth travel of sheets into delivery area. It is also the drive shaft and housing for chain sprockets which drive delivery grippers.

(14) *Feeder group (14).*

(a) Sheet smoother and accessories. Located on feeder tape table. Sheet smoother has brushes, roller wheels, and cage balls that control sheets as they travel down feeder tape table.

(b) Static bar assembly. Static eliminator bar is located on feeder assembly over sheet pile. Power unit is located on drive side of printing press behind belt guard.

(c) Universal joint shaft. Located between suction head and feeder D/S frame. Drive shaft for suction head.

(d) Suction head assembly. Located at top of feeder. Supplies paper to forwarding assembly by lifting and forwarding sheets.

(e) Sheet forwarding assembly. Located on top of feeder tape table. Receives sheets from suction head and starts forwarding sheets on feeder tape table. Driven by a chain and sprocket on drive side.

(f) Double sheet detector mechanism. Located at top center of feeder tape table. Contains microswitch with two wheels connected by levers that stops forwarding sheets if more than one sheet is detected.

(g) Magnetic clutch assembly. Located in feeder (D/S) frame. It is the feeder driving and braking unit.

(h) Feeder pile lift motors. These motors, located on the feeder (D/S), drive chains which raise and lower the pile. Microswitches located directly over the chains limit feeder pile board height. The main pile lift motor, and its associated drive chain and control switch, is located further from the press. The auxiliary pile lift motor is located closer to the press.

(15) *Compressor (15).* Located under footstep on drive side of printing press (delivery end). Supplies suction air to suction head and suction slowdown drum. Also supplies blower air to feeder and delivery areas. Some printing presses are equipped with an oil lubricated compressor (figure 1-4) and others are equipped with a dry (oilless) compressor.

1-8. Location and Description of Major Components (cont).

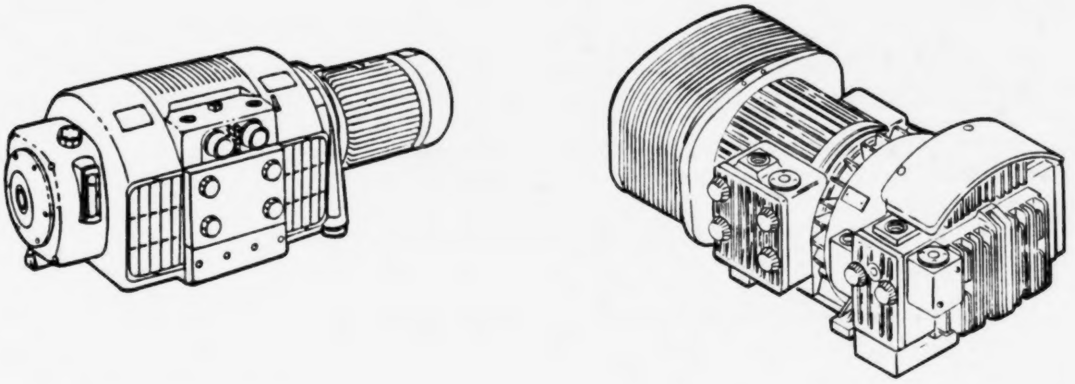

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Figure 1-4. Oil Lubricated and Dry (Oilless) Compressor Models.

(16) *Electrical group (16).*

(a) Main power box. Located at feeder end on drive side (D/S) of the printing press. Contains relays, contactors, and other electrical components which supply electrical power to the printing press.

(b) Electronic control box. Located under feeder tape table on the operator's side (O/S) of printing press. Controls operation of feeder and ranger drum by sensing signals sent from light sensors.

(c) Main control box. Located on operator's side (O/S) of feeder. Operator's main control station.

(d) Auxiliary control boxes. Mounted in several areas on printing press. Allow operator to control specific printing press operations from those areas.

(17) *Control register system (17).* (figure 1-5) This plate punch is mounted on its own stand (1) and is located in press section. A manually operated lever system (2) causes cutting tools (3) to punch locating notches in a print plate (4) when correctly positioned on the control register easel (5). These notches are used to aline plate with register scopes on printing press plate cylinder.

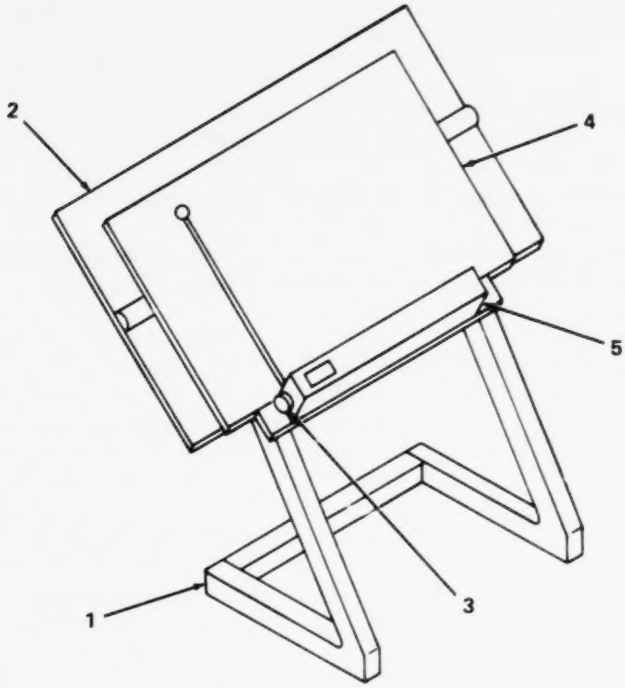

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Figure 1-5. Control Register System.

1-9. Equipment Data. Refer to TM 5-3610-286-10 for general equipment data for the printing press. The additional data in table 1-2 supports organizational level maintenance.

Table 1-2. Equipment Data.

Component	Characteristics
Main Motor	220V ac, 3-phase, 60 Hz Variable data: Speed: 480 – 2520 RPM Current: 10.3A – 18.0 A Rated power: 0.9kW – 4.75kW
Main Motor Regulator Motor	220V ac, 0.9A, 3-phase, 60 Hz Rated: 0.04kW at 1100 RPM
Compressor (Oil lubricated)	220V ac, 11.0A, 3-phase, 60 Hz Rated: 2.5kW at 1450 RPM Capacity: 60 cubic meters/hour
Compressor (Dry)	Same as oil lubricated compressor.

Table 1-2. Equipment Data (cont).

Component	Characteristics
Pile Lift Motors (3)	220V ac, 1.8A, 3-phase, 60 Hz Rated: 0.33kW at 1580 RPM
NOTE Two feeder pile lift and one delivery pile lift.	
Feeder Suction Motor	220V ac, 5.6A, 3-phase, 60 Hz Rated: 1.3kW at 3400 RPM
Suction Slowdown Motor	220V ac, 0.24A, 3-phase, 60 Hz Rated: 0.03kW
Static Eliminator	220V ac, 0.12A, 60 Hz
Circuit Protection	
Main Circuit Fuses (3)	35A, cartridge type
Main Motor Fuses (3)	25A, cartridge type
Transformer Control Fuses (3)	6A, cartridge type
Rectifier Fuse	6A, cartridge type
Electronic Control Box Fuses (3)	2A, 4A, 5A, plug type
Inductor Light Fuse	4A, cartridge type
Static Eliminator Unit Fuse	6A, cartridge type

Section III. Principles of Operation

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1-12. Control and Monitoring 1-16
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1-10. Principles of Operation. The TSS Printing Press is a high speed, rotary offset press which prints on any of a large variety of paper types and thicknesses. The press prints from a metal printing plate produced by a photolithographic process.

a. Lithography. In lithographic printing, the matter to be printed is not raised above the surface of the printing plate (as in letterpress printing) nor sunk below the surface of the printing plate (as in intaglio printing). The matter to be printed is transferred, by some means, to the surface of the plate.

Lithography is based on the principle that grease and water do not mix, but actually repel each other. Water is applied to the printing plate to moisten it. Then, a greasy printing ink is applied to the plate. The matter to be printed accepts the ink, while the blank surface of the plate which is wet rejects the ink. Then, the inked matter to be printed can be transferred to paper.

b. *Photolithography.* Printing plates can be made of many types of materials, usually stone or metal. Metal plates have the advantage that they can be made thin enough to wrap around a cylinder in a rotary type printing press. This makes high speed printing possible. The TSS printing press output is variable up to 6,000 impression per hour. Metal printing plates are made by a photographic process. The plate, usually made of zinc or aluminum, is given a sensitive coating. The plate is exposed to light through a negative of the matter to be printed and then developed, washed and etched. The etching process creates the rough surface that holds the greasy ink, while the smooth, unetched surface only holds water.

c. *Offset Printing.* Generally, the matter to be printed (the image on the printing plate) is not transferred directly onto the paper. It is first transferred to an intermediate, rubber cylinder (the blanket cylinder) which then transfers (offsets) the image to the paper. Because of the flexibility of the rubber cylinder, the image can be transferred to paper of many different thickness, to cardboard, and to other materials. The offset printing press normally contains three rotating cylinders. The plate cylinder carries the metal printing plate which is wrapped around it and clamped in place. The blanket cylinder carries the rubber blanket which is wrapped around the cylinder and clamped in place. The impression cylinder presses the paper against the blanket cylinder. Moistening rollers, which apply a film of water to the plate, and inking rollers, which apply ink to the plate, comprise the remaining components used in the offset printing process.

1-11. Supporting Functions. The primary functions that support offset printing are concerned with moving blank paper into and through the press and delivering printed paper out of the press. Electrical, electronic, and mechanical devices are used to control and monitor these functions. Safety devices are provided to protect the operator.

a. *Paper Lifting.* Large quantities, or piles, of paper are carried on wooden pallets. The entire pallet is lifted in the feeder by means of a pile lift motor and a chain and sprocket arrangement. Lifting is timed so that the top sheet of the pile is always high enough to be picked up by the suction head. Pile lifting stops when the last sheet is fed into the press. A similar arrangement of pile lift motor and chain and sprocket drive is located under the delivery end of the press. Printed paper is transported to the top of the pile. The pile pallet is lowered so there is room for each printed sheet to drop onto the top of the pile. The delivery pile motor stops when the pile pallet is fully loaded, usually when the pallet reaches the floor. Limit switches determine the upper and lower limits of lift of the pallets. The feeder and delivery pile motors are interlocked so that if one stops, the other also stops, preventing paper pileup. The TSS printing press has a second feeder pile lift motor and chain and sprocket drive to allow continuous feed operation. In this mode, a continuous feed rake is inserted into the delivery end of the press to catch printed pages instead of the delivery pallet. A limit switch, operated by inserting the rake, keeps the delivery pile motor shut off in continuous feed operation.

b. *Sheet Lifting.* Individual sheets of paper are flimsy and easily crumpled, yet difficult to pick up. Sheet lifting is accomplished by means of suction. A vacuum is created in a pump and directed to a sucker head which is placed against the paper. Atmospheric pressure behind the paper forces the paper against the sucker head. When the head is moved, the paper moves with it. When the sucker has brought the sheet of paper to the desired position, the vacuum is cut off, releasing the paper.

1-11. Supporting Functions (cont).

c. Sheet Separation. Sheets of paper in piles tend to stick together. Compressed air is blown at the edge of the paper pile to separate the sheets. This allows atmospheric pressure to be applied behind each sheet, allowing the lifting suckers to work. Similarly, static electricity build up in the paper pile will cause paper to stick together. It will also cause the paper to misfeed through the press, and may sometimes repel ink. A neutralizer bar mounted in the feeder is used to eliminate static charges from the paper.

d. Sheet Feed. Sheets of paper are lifted to the edge of the feeder table by the suction head. Moving belts on the table surface pull the paper down across the table when the suction head suckers release the sheet. The vacuum applied from below through holes in the table, and rotating wheels on top of the paper sheets, keep the sheets smooth and running straight down to the front lays of the press. Here, they are alined with the press and ready to be printed. This successive feeding of individual sheets of paper in a stream is what is referred to when the press is called "stream fed".

e. Sheet Transport. Since thin sheets of paper cannot be pushed without crumpling, they are always pulled through the press. Mechanical grippers grasp the leading edge of each sheet of paper as it reaches a particular position in the press. They then release the paper when it is time for it to leave that position. Thus, the sheet of paper is handed off from position to position. Paper presented to the press by the feeder table is grasped by the ranger drum and moved to where it can be grasped by the impression cylinder. The ranger drum grippers release, the impression cylinder grippers grasp, and the paper wraps around the impression cylinder to be printed. After printing, the impression cylinder grippers release the paper. The edge of the paper, guided and supported by the transport (skeleton) cylinder, is grasped by the delivery end grippers and pulled off of the impression cylinder. The delivery end grippers release when the printed sheet is over the suction slowdown assembly. This assembly applies a vacuum to the sheet, through rotating suction wheels, slowing down the released sheet so that it does not overshoot the delivery end paper pile. Finally, a blast of compressed air directs the paper downward onto the delivery end paper pile.

1-12. Control and Monitoring. In addition to mechanical controls for operating and adjusting press components, and electrical controls for operating the press and the feeder, an electronic control box and related light sensors are built in to the press to monitor operation. The press will not go on impression if no paper has reached the front lays or if the press has not reached the preset operating speed. The press will also not go on impression if a misalined sheet of paper enters the press.

1-13. Lubrication. In general, most moving components of the press that are lubricated by oil are serviced by a central lubrication distribution system. Oil stored in a reservoir is drawn out by a submerged pump when a manually actuated valve is operated by the press operator as directed by operator's PMCS. This oil is distributed by pressure, generated by valve operation, to various lubrication heads. These are located between the press main guard (D/S) and the D/S side plate, between the upper guard (O/S) and the O/S side plate, and over the sprocket drives in the feeder. These heads have a number of metered valves that dispense oil at a predetermined flow rate to fittings on various rotating components. In addition, some valves feed open-end tubes from which oil is allowed to drip onto moving surfaces, such as cams, for lubrication. Some components, such as the main motor and the compressor, are not part of the system and must be lubricated separately. Additionally, many of the press rollers have bearings that must be lubricated by grease. These are equipped with grease fittings for manual lubrication.

CHAPTER 2

ORGANIZATIONAL MAINTENANCE

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OVERVIEW

This chapter provides information for preventive maintenance, and troubleshooting of the TSS printing press by organizational level maintenance personnel. Maintenance procedures in this chapter for removal and installation, repair, and adjustment of printing press components, do not require removal of the printing press from the press section.

Section I. REPAIR PARTS; SPECIAL TOOLS; TEST, MEASUREMENT, DIAGNOSTIC EQUIPMENT (TMDE); AND SUPPORT EQUIPMENT

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2-1. Common Tools and Equipment. For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

2-2. Special Tools, TMDE and Support Equipment. For a listing of special tools, TMDE, and support equipment authorized for use on this equipment, refer to the Repair Parts and Special Tools List, TM 5-3610-286-20P, and the maintenance allocation chart (MAC), appendix B of this manual.

2-3. Repair Parts. Repair parts are listed and illustrated in the Repair Parts and Special Tools List for Topographic Support System Press Section Printing Press, TM 5-3610-286-20P.

Section II. SERVICE UPON RECEIPT

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2-5.	Initial Service	2-2
2-6.	Operational Check	2-2

2-4. Checking Unpacked Equipment.

a. Inspect the equipment for damage incurred during shipment. If the equipment has been damaged, report the damage on SF Form 364, Report of Discrepancy (ROD).

b. Check the equipment against the packing slip to see if the shipment is complete. Report all discrepancies in accordance with the instructions of DA PAM 738-750.

c. Check to see whether the equipment has been modified.

2-5. Initial Service. The printing press has a protective coating that must be removed.

WARNING

CLEANING SOLVENT. Lithographic solvent is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat. If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

Using a rag dampened with lithographic solvent, wipe down all surfaces until coating is completely removed. Lightly oil all exposed metal parts.

2-6. Operational Check. Perform all organizational PMCS as required by Table 2-1. Observe all warnings and safety precautions. Run the printing press at washup speed to ensure it operates properly. Check that all safety switches on gates, guards and covers are operating to protect personnel and to prevent damage to equipment. If problems exist, troubleshoot in accordance with Table 2-5.

Section III. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

Para.		Page
2-7.	General	2-2
2-8.	Lubrication	2-3
2-9.	PMCS Procedures	2-3

2-7. General. Organizational maintenance level PMCS are done to ensure that the printing press is in top operating condition. A comprehensive PMCS program reduces equipment downtime and increasees the operational readiness of the TSS press section.

a. *Routine PMCS.* For some printing press components, routine PMCS are not listed in the PMCS table. Routine PMCS that are listed in the PMCS table are there because others have reported unusual or significant problems with a particular item. Some routine PMCS should include the following:

(1) Check for loose, broken, or missing operating handles, knobs, and ink fountain keys.

(2) Check for loose safety gates, guards and covers.

(3) Check vacuum and compressed air hoses for cracks, sponginess, or evidence of drying out and brittleness.

(4) Check for loose electrical connectors, damage to electrical conduits and sheaths, and loose connection at electrical terminals.

(5) Inspect for evidence of overheating or arcing in electrical motors.

(6) Check for missing red lock down wing nuts.

(7) Inspect for rust on external surfaces and internal moving parts.

NOTE

If printing press section has been immobile for a long period, check level of TSS press section quarterly (refer to TM 5-3610-287-24). In rainy or soft ground conditions, check monthly.

b. Operational Test. Perform operational test of the printing press if inspection indicates poor or spotty operator maintenance. Refer to TM 5-3610-286-10 for operator level PMCS. If press does not function normally, PMCS procedures, properly performed, may correct a large percentage of printing press problems.

2-8. Lubrication. Refer to LO 5-3610-286-12 and perform organizational level lubrication as required. On printing presses equipped with "dry" compressors, bearings should be lubricated annually with grease at grease fitting.

2-9. PMCS Procedures. Organizational level PMCS is contained in table 2-1. The numbers in the Item No. column show the order in which the check or service should be done. These numbers should be used when recording deficiencies and shortcomings on DA Form 2404, Equipment Inspection and Maintenance Worksheet. The ● in the Interval column indicates when a check or service should be done, as follows:

M – Monthly, Q – Quarterly, S – Semiannually, and A – Annually

Table 2-1. Organizational Preventive Maintenance Checks and Services (PMCS).

M – Monthly Q – Quarterly S – Semiannually A – Annually

Item No.	Interval				Item to be inspected	Procedures
	M	Q	S	A		
1			●		Printing Press	a. Visually inspect entire printing press, moving in 360 degree circle around the printing press, starting at feed tape table. Check for tampering, damage, or parts missing since last inspection. Remove the main guard (D/S), and the upper and lower guards (O/S) and inspect for damage and wear of components since last inspection. Also look for signs of rust or corrosion. Remove feeder pile life chain guard and inspect for damage and wear of components.
		●				b. Check timing adjustment of printing press operations (para. 2-98).

Table 2-1. Organizational Preventive Maintenance Checks and Services (PMCS) (cont).

M – Monthly Q – Quarterly S – Semiannually A – Annually

Item No.	Interval				Item to be inspected	Procedures
	M	Q	S	A		
						WARNING ● EXPOSED MOVING PARTS. Do not inch printing press and wipe cylinders at the same time. Return printing press to SAFETY STOP after each inching. Failure to do so may result in serious injury. ● CLEANING SOLVENT. Lithographic solvent is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat. If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.
2			●		Cylinders	Inspect bearers for buildup of gum residue. Use damp rag to soften gum residue. Use rag and lithographic solvent (appendix C, item 5) to clean bearers. Wipe dry with clean rag. Apply thin coat of oil (appendix C, item 3) for rust protection.
3			●		Dampening Roller Bearer Journals	Inspect journals, bearings, couplings and pivots for rust due to water solution splash. Wipe with clean rag and apply thin coat of oil (appendix C, item 3). If pivot is frozen, remove and clean (para. 2-38). Lubricate bearing at grease point (1). (appendix C, item 1)

Table 2-1. Organizational Preventive Maintenance Checks and Services (PMCS) (cont).

M – Monthly Q – Quarterly S – Semiannually A – Annually

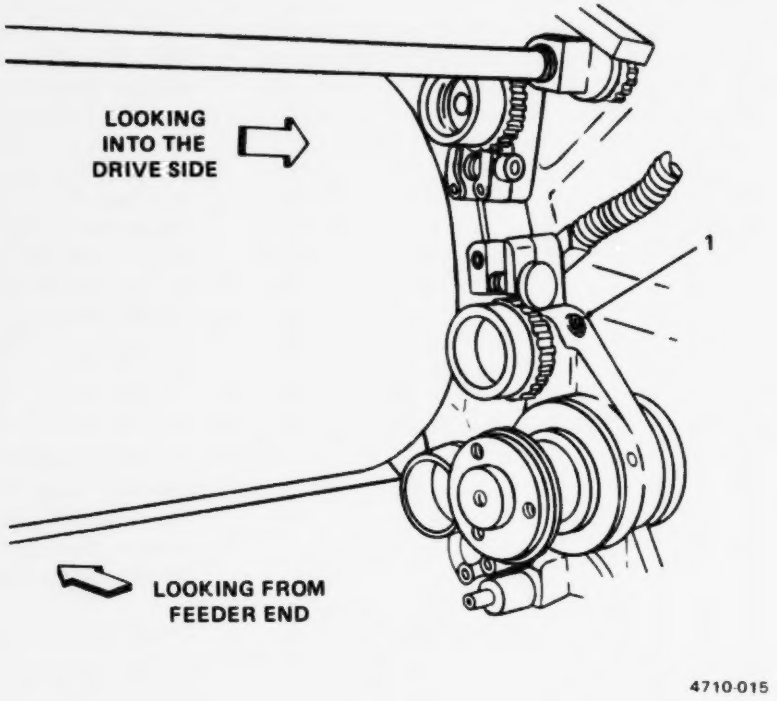
Item No.	Interval				Item to be inspected	Procedures
	M	Q	S	A		
						 LOOKING INTO THE DRIVE SIDE LOOKING FROM FEEDER END 1 4710-015 *Figure 2-1. Dampening Roller Journal Inspection.*
4		●			Inking Rollers	INKING ROLLERS. Inspect rollers for cuts, nicks or evidence that ink buildup has been scraped off. Replace if roller surface is damaged (refer to TM 5-3610-286-10).

Table 2-1. Organizational Preventive Maintenance Checks and Services (PMCS) (cont).

M – Monthly Q – Quarterly S – Semiannually A – Annually

Item No.	Interval				Item to be inspected	Procedures
	M	Q	S	A		
5		●			Safety Devices	**WARNING** EXPOSED MOVING PARTS. All adjustments will be made while printing press is on SAFETY STOP except those authorized by this manual to be made with printing press running. Printing press must be on safe at all times when not in motion. Always shout "clear" and wait for "clear" response before taking printing press off safe to inch or run. Failure to follow this warning may result in serious injury. **WARNING** EXPOSED MOVING PARTS. Remove all jewelery. Keep shirts tucked in, sleeve above elbows, and ties removed. Failure to observe these precautions while operating printing press may result in serious injury. a. Check for loose safety guards, gates or covers. b. Check that safety switches stop press operation when guards, gates or covers are partially opened (refer to table 2-2). If switches do not operate immediately, check and adjust position of microswitches (refer to para. 2-16).
6		●			Main Control Box	Check that panel doors cannot be opened when main power switch is on (refer to para. 2-93).
7		●			Suction Drum	Clean drum head filter (refer to para. 2-59).

Table 2-1. *Organizational Preventive Maintenance Checks and Services (PMCS) (cont).*

M – Monthly Q – Quarterly S – Semiannually A – Annually

Item No.	Interval				Item to be inspected	Procedures
	M	Q	S	A		
8		●			Main Motor	Remove motor covers and vacuum clean of dust (refer to para. 2-79).
9			●		Main Motor Brushes	Check for wear, brush pressure, and movement of commutator brushes in holder (refer to para. 2-79). Check for firmness of contact between lead and brush (on commutator side) and between brush and brush holder (on slipring side). Replace commutator-carbon brushes when they are worn to a length of 0.39 in. (10 mm). Replace slipring brushes when running edge protrudes 0.79 to 1.18 in. (2 to 3 mm) over lower retaining rim (refer to para. 2-79).
10			●		V-Belt	Check for loose or worn V-belt. Place a straight edge against motor pulley and flywheel. Check for approximately 1/4" (5 mm) deflection. If too loose or too light, adjust V-belt (refer to para. 2-80).

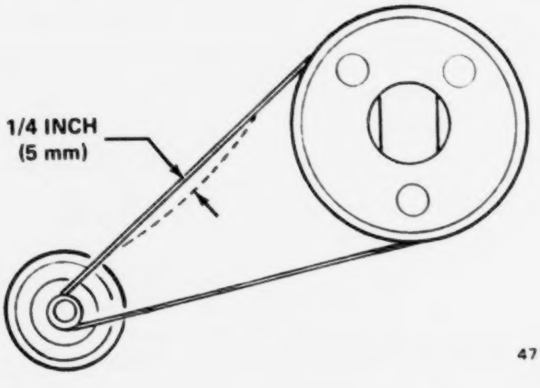


Figure 2-2. V-Belt Deflection Inspection.

Section IV. ORGANIZATIONAL TROUBLESHOOTING

Para. Page

2-10. General.......... 2-8

2-10. General. This section contains troubleshooting procedures to determine the probable cause of observed equipment malfunctions. Tests or inspections are provided to isolate the faulty component and corrective actions are provided to eliminate the malfunction.

a. Procedure. Refer to the symptom index to locate the troubleshooting procedure for the observed malfunction. The table lists the common malfunctions that may occur during the operation or maintenance of the printing press. Perform the tests or inspections, and the recommended corrective action in the order listed in the troubleshooting table. If the malfunction is corrected by a specific corrective action, do not continue with the remaining steps, if any, of the troubleshooting procedure.

b. *Electrical Tests.* Observe all warnings and cautions when making electrical tests. Before checking the printing press, make sure that electrical power from an external source is supplied to the press section. Also check that all safety switches are operating properly, and all guards are in position to allow the press to operate (refer to table 2-2). When performing electrical tests, begin with power checks, continuity checks, and other procedures that may have cut off power supplied to the suspected faulty component. In most cases, the malfunction is caused by lack of power to a component rather than a fault in a component. Do not attempt to replace or repair a component until continuity from the power source is checked.

NOTE

Wires are pretagged in the printing press and match their connecting points. If wiring is replaced, retag wires.

Table 2-2. Safety Switches.

Reference designation	Normal condition	Function	Location
b8	MACHINE OPERATE/ FEEDER STOP	Operating Safety (Interlocks with b11)	Feeder Control Panel
b11	OPERATE/SAFETY	Operating Safety (Interlocks with b8)	Delivery End (O/S) Control Panel
b26	NC	Ink Roller Guard	Feeder End
b30	NC	Finger Safety	Delivery End
b31	NC	Form Roller Safety	O/S Side Plate

Table 2-2. Safety Switches (cont).

Reference designation	Normal condition	Function	Location
b42	NC	Plexiguard Delivery	O/S Side Plate
b59	NC	Paper Safety	Delivery End
b89	NC	Upper Pile Safety Limit Switch	Feeder
b90	NC	Suction Head Safety Limit Switch	Feeder Suction Head
b135	NO	Cylinder Guard	Feeder End

NC = Normally closed

NO = Normally open

c. *Reference Designations.* The reference designations used throughout the text are those provided by Heidleberg. These reference designations are not to military specifications, but are used in this manual because they appear on tags, nameplates and components on the equipment. A list of reference designations used in this manual is provided in table 2-3. Refer to table 2-4 for a listing of all printing press electrical components. They are listed by reference designation and identify their specific description and function.

Table 2-3. Reference Designation.

Ref des	Component
a	Main switch, overload
b	Micro switch, toggle
c	Contactors
d	Auxiliary contactors
e	Fuses, thermistors
g	Generators
h	Control lamps, indicators
m	Motors

Table 2-3. Reference Designation (cont).

Ref des	Component
n	Rectifiers
s	Solenoid
u	Electronics

Table 2-4. Electrical Components.

Type	Reference designator	Description	Function
Motor switches	a1	Main switch	On/off switch for electrical equipment
	a4	Motor protection switch	Regulating motor
	a6	Motor protection switch	Pile hoist motor feeder
	a8	Motor protection switch	Pile hoist motor delivery
	a9	Motor protection switch	Compressor
	a10	Motor protection switch	Powder spray
	a13	Motor protection switch	Suction brush
	a17	Motor protection switch	Sheet stretching device
	a21	Motor protection switch	Suction drum
	a40	Motor protection switch	Auxiliary pile motor
Main three-phase contactor	c1	Three-phase contactor	Main motor, backward rotation
	c2	Three-phase contactor	Main motor, forward rotation
	c3	Three-phase contactor	Regulating motor, fast
	c4	Three-phase contactor	Regulating motor, slow
	c5	Three-phase contactor	Pile hoist motor, feeder up
	c5a	Three-phase contactor	Safety contactor, feeder pile hoist
	c6	Three-phase contactor	Pile hoist motor, feeder down
	c7	Three-phase contactor	Pile hoist motor, delivery up

Table 2-4. Electrical Components (cont).

Type	Reference designator	Description	Function
Main three-phase contactor (cont)	c8	Three-phase contactor	Pile hoist motor, delivery down
	c8a	Three-phase contactor	Auxiliary pile, up
	c9	Three-phase contactor	Compressor
	c10	Three-phase contactor	Auxiliary pile, down
	c14	Three-phase contactor	Powder spray, on
	c21	Three-phase contactor	Suction cylinder
Auxiliary contactor and time relay	d3	Auxiliary contactor	Interlocking panel
	d4	Auxiliary contactor	Interlocking delivery
	d5	Auxiliary contactor	Operating
	d6	Auxiliary contactor	Forward
	d7	Auxiliary contactor	Backward
	d8	Auxiliary contactor	Preset speed
	d10	Auxiliary contactor	Return motion
	d11	Auxiliary contactor	Electronic preset, on
	d13	Auxiliary contactor	Feeder, stop
	d13a	Auxiliary contactor	Parallel contactor to d13
	d14	Auxiliary contactor	Impression, on
	d15	Auxiliary contactor	Impression presetting feeder
	d18	Auxiliary contactor	Powder, on
	d20	Auxiliary contactor	Feeder, stop
	d59	Auxiliary contactor	Upper delivery pile stop and motor stop
	d103	Auxiliary contactor	Feeder pile, automatic up
	d107	Auxiliary contactor	Auxiliary pile feeder
	d111	Auxiliary contactor	Overshooting sheet

Table 2-4. Electrical Components (cont).

Type	Reference designator	Description	Function
Auxiliary contactor and time relay – (cont)	d121	Auxiliary contactor	Lower delivery stop and feeder stop
	d211	Time relay	Inch limit
	d225	Auxiliary contactor	Auxiliary pile, brake up
	d226	Auxiliary contactor	Auxiliary pile, brake down
	d227	Auxiliary contactor	Pile hoist motor feeder, brake up
	d228	Auxiliary contactor	Pile hoist motor feeder, brake down
	d229	Auxiliary contactor	Pile hoist motor delivery, brake up
	d230	Auxiliary contactor	Pile hoist motor delivery, brake down
	d243 d243a	Auxiliary contactor	Safety switch, inching
	d244	Auxiliary contactor	Safety switch, inching
	d245	Auxiliary contactor	Safety switch, inching
	d300	Auxiliary contactor	Production control
Rectifier and battery	n1	Rectifier	
Mechanical Devices	s1	Speed regulating device	Preset speed-preselection
	s3	Magnet	Solenoid for sheet holding fingers
	s4	Lamina brake	Main motor brake
	s7	Spring preset brake	Main pile feeder brake
	s8	Spring preset brake	Auxiliary pile feeder brake
	s9	Spring preset brake	Main pile delivery brake
	s10	Magnet	Preset, on
	s21	Magnet	Coupling magnet feeder, on-off

Table 2-4. Electrical Components (cont).

Type	Reference designator	Description	Function
Motors	m1	Main motor	
	m2	Regulating motor	
	m3	Compressor	
	m4	Pile hoist motor, feeder	
	m5	Pile hoist motor, delivery	
	m6	Transformer for control	
	m7	Powder spray blower motor	
	m9	Chocking coil	
	m10	Suction brush	
	m14	Sheet stretching device	
	m20	Auxiliary pile motor	
	m21	Suction drum motor	
Light and heat transmitting	h1	Pilot light bezels	Switch gear on, switchgear
	h10	Pilot light bezels	Switch gear on, main panel
Auxiliary switch, operating control on the delivery d.s.	b14a	Push button	Operating
	b71	Push button	Impression, on
	b3	Push button	Backward
	b150	Emergency stop	Stop
	b2	Push button	Forward

Table 2-4. Electrical Components (cont).

Type	Reference designator	Description	Function
Auxiliary switch, operating panel at feeder	b4	Toggle switch	Compressor, on
	b8	Selector switch	Safety
	b9	Push button	Forward, feeder
	b15	Push button	Fast
	b16	Push button	Slow
	b17	Push button	Preset speed
	b70	Push button	Impression, on
	b83	Push button	Feeder, stop
	b84	Push button	Feeder, on
	b151	Emergency stop	Stop
	b14	Push button	Operating
Auxiliary switch, operating control on the delivery o.s.	b15a	Push button	Fast
	b16a	Push button	Slow
	b11	Selector switch	Safety
	b22	Push button	Pile, up
	b23	Push button	Pile, down
	b61	Toggle switch	Powder spray
	b140	Toggle switch	Sheet counter
Auxiliary switch, operating control on feeder	b20	Push button	Main pile, up
	b21	Push button	Main pile, down
	b101	Push button	Feeder stop
Auxiliary switch, operating control on feeder (non-stop)	b20	Push button	Main pile, up
	b21	Push button	Main pile, down
	b101	Push button	Feeder, stop

Table 2-4. Electrical Components (cont).

Type	Reference designator	Description	Function
Auxiliary switch, operating control on feeder (non-stop) (cont)	b52	Push button	Auxiliary pile, up
	b53	Push button	Auxiliary pile, down
	b100	Selector switch	Auxiliary pile – Main pile
	b26	Limit switch	Safety guard, feeder end
	b30	Limit switch	Finger safety, delivery end
	b30a	Limit switch	Non-stop delivery
	b31	Limit switch	Form roller I
	b32	Limit switch	Slow speed
	b33	Limit switch	High speed
	b34	Limit switch	Slow speed
	b35	Limit switch	Preset speed limit
	b36	Limit switch	Upper main pile limit switch
	b37	Limit switch	Main pile limit switch lower
	b37a	Limit switch	Pile delivery, lower
	b39	Limit switch	Upper pile hoist limit switch
	b42	Limit switch	Plexiguard delivery
	b50	Limit switch casing	Main motor brake
	b59	Limit switch casing	Paper safety on delivery
	b80	Limit switch	Delivery pile control
	b81	Limit switch casing	Delivery pile control
	b81a	Limit switch casing	Auxiliary pile feeder
	b82	Micro switch casing	Double sheet control
	b86	Micro switch casing	Main pile limit switch
	b87	Limit switch	Limitation of auxiliary pile, top
	b89	Limit switch	Upper pile safety limit switch

Table 2-4. Electrical Components (cont).

Type	Reference designator	Description	Function
Auxiliary switch, operating control on feeder (non-stop) (cont)	b90	Limit switch	Safety limit switch, suction head
	b91	Limit switch	Limitation of auxiliary pile, bottom
	b92	Limit switch casing	Limit switch suction head
	b107	Limit switch	Powder, on
	b135	Limit switch	Cylinder guard
	b209	Limit switch	Suction drum
	b141	Limit switch	Missing sheet detector cam
Protection devices	e3	Fuses carrier	Main motor, 250V
	e7	Fuses carrier	Primary transformer for control, 250V
	e5 + e7a + e14	Fuses carrier	Secondary voltage circuit protection
	e12	Fuses carrier	Motors m2, m3, m4, m5, m7, m10, m11, m20, m21, 250V
	e26	Fuses carrier	Indicator lamps
	e31	Short circuit protector 2A	Electronic
	e32	Short circuit protector 4A	Electronic
	e33	Short circuit protector 5A	Electronic
		Fuse element for miniature fuse	
Accessories	u1	Anti static eliminator complete for 220V/50Hz	Removal of static electricity
		Consisting of: power box on press, neutralizer bar on feeder	

Table 2-4. Electrical Components (cont).

Type	Reference designator	Description	Function
Accessories (cont)	u2	Electronic unit complete BAK Consisting of: sheet feeder electronic BAE reflex light barrier RL 1 Pulse switch adapter	Sheet feeder control
	u3	Delivery lighting cpl.	
	u5	Powder heating unit	
	u20I, u20II	Sheet counter, complete – 28V	
	g3	Speed indicator	
	g7	Tacho dynamo	

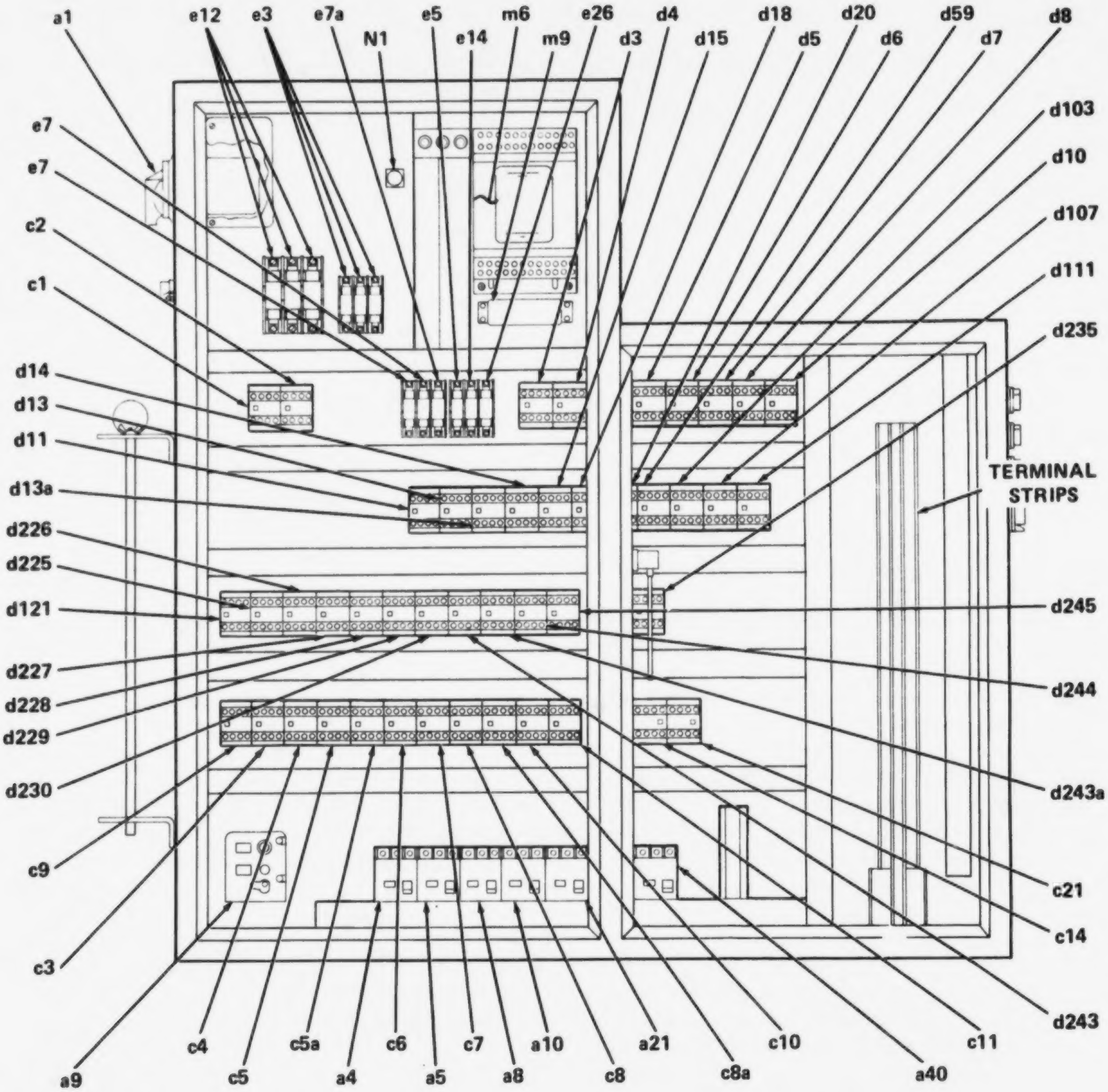
d. *Use of Schematic.* Figure FO-1 is a detailed electrical schematic of the TSS printing press. Refer to this schematic when performing electrical troubleshooting procedures. Test points are indicated by number or letter so that continuity or voltage readings, as required, can be made. This determines if a particular component, electrically wired between two test points, is malfunctioning. Test points such as A1-A2, 13-14, etc. for relays or contactors are located on the face of the component. Tests on relays and contactors must be made with the panels of the main control box removed. Refer to figure 2-1 to locate components in the main control box. In the case of relays and contactors, several circuits may pass through different sets of terminals or their components. The relay or contactor may be functioning correctly in one circuit, but malfunctioning in another. Since these are nonrepairable items, they should be replaced if there is any problem with any circuit. Additional test points are located on the terminal strips in the main power control box (figure 2-1). The schematic is laid out as a ladder with reference locations across the top. This aids in making sure that all components in the circuit (a straight line between signal or voltage supply and return) are accounted for when checking out a circuit.

WARNING

Main control box door locking solenoid holds panel doors shut during operation. It does NOT shut off power if doors are already open for troubleshooting and main power switch is set to ON.

e. *Unidentifiable Malfunctions.* This manual cannot list all of the malfunctions that may occur, nor all the tests and inspections and corrective actions. If a malfunction is not listed or is not corrected by the listed corrective actions, notify your supervisor.

2-10. General (cont).


a1
e12
e3
e7a
e5
m6
e26
d4
d18
d20
d59
d8
N1
e14
m9
d3
d15
d5
d6
d7
e7
e7
c2
c1
d14
d13
d11
d13a
d226
d225
d121
d227
d228
d229
d230
c9
c3
d103
d10
d107
d111
d235
TERMINAL STRIPS
d245
d244
d243a
c21
c14
d243
a9
c4
c5
c5a
a4
c6
a5
c7
a8
a10
c8
a21
c8a
c10
a40
c11

4710-009

Figure 2-1. Main Control Box Component Locations.

SYMPTOM INDEX

	Troubleshooting Procedure Page
Air blast gage reads low or no pressure	2-53
Delivery gripper bars to not grip paper properly	2-41
Delivery light does not operate	2-49
Delivery pile board will not lower	2-46
Delivery pile board will not lower automatically	2-41
Delivery pile board will not raise	2-43
Feeder and suction head do not run smoothly	2-35
Feeder board does not lower into position	2-28
Feeder board does not raise into position	2-26
Feeder board moves up, but sheets will not feed forward	2-34
Feeder board will move up when main pile up pushbutton (b20) is pressed, but will not move up automatically	2-21
Feeder does not cut off when sheets are missing or misfed	2-36
Feeder will not operate when FEEDER ON pushbutton is pressed	2-32
Impression cylinder does not grip paper properly	2-37
Impressions per hour gage does not operate	2-52
Main power control light lights, but main drive motor (ml) does not operate when OPERATION pushbutton (b14) is pressed	2-23
Main power control light will not light when main power switch is turned on	2-20
Printing press does not print when IMPRESSION ON/FEEDER ON pushbutton (b70) is pressed	2-38
Printing press does not stop immediately (coasts) when safety stop pushbutton is pressed	2-54
Printing press does not stop when cylinder guard is removed	2-55
Printing press does not stop when safety guard or finger safety guard is tripped	2-55
Sheet counter is on and does not operate	2-21
Sheets feed forward, but are not gripped correctly by register feed drum grippers	2-36
Static eliminator does not operate	2-50
Vacuum gage indicates low or no vacuum	2-53

Table 2-5. Organizational Troubleshooting.

Malfunction

Test or inspection

Corrective action

---

1. MAIN POWER CONTROL LIGHT WILL NOT LIGHT WHEN MAIN POWER SWITCH IS TURNED ON.

WARNING

HIGH VOLTAGE

- Do not operate printing press until you are sure TSS Press Section is connected to a suitable ground. Failure to do so may result in death or serious injury.
- Shut off power source before attempting to disconnect, service, or connect wires or cables. Failure to do so may result in death or serious injury.
- When working on high-voltage components, always have an additional person present, and keep one hand away from equipment to reduce hazard of current flowing through vital organs of body. Remove all jewelry from fingers, wrists, and neck prior to working on electrical components. Failure to do so may result in death or serious burns.

Step 1. Assure that Press Section panel circuit breakers are ON. Using a multimeter set to range higher than 220V ac, check for 220V ac at output side of press section load center circuit breakers.

If no power is present, refer to press section electrical troubleshooting in TM 5-3610-287-24.

If power is present proceed to step 2.

Step 2. Using a multimeter set to range higher than 220V ac, check for 220V ac at input terminals to main power switch.

If power is present, proceed to step 3.

If no power is present, check wiring to press and replace as required.

Step 3. Using a multimeter set to a range higher than 220V ac, check for 220V ac at main power switch output terminals.

If power is present, proceed to step 4.

If no power is present, replace main power switch (para. 2-93).

Table 2-5. Organizational Troubleshooting (cont).

Malfunction
Test or inspection
Corrective action

1. MAIN POWER CONTROL LIGHT WILL NOT LIGHT WHEN MAIN POWER SWITCH IS TURNED ON (cont).

Step 4. Turn main power switch OFF. Using a multimeter set to ohms range, check fuses (e12) for continuity.

If continuity is present, go to step 5.

If no continuity is present, replace fuses (e12) (para. 2-93).

Step 5. Using multimeter set to ohms range, check fuses (e7) for continuity.

If continuity is present, go to step 6.

If no continuity is present, replace fuses (e7) (para. 2-93).

Step 6. Turn main power switch ON. Using multimeter set to range higher than 22V ac, check for 22V ac across 0-22V output terminals of transformer.

If 22V ac is present, go to step 7.

If 22V ac is not present, replace transformer (para. 2-93).

Step 7. Turn main power switch OFF. Using multimeter set to ohms range, check fuse (e26) for continuity.

If continuity is present, go to step 8.

If no continuity is present, replace fuse (e26) (para. 2-93).

Step 8. Turn main power switch ON. Using a multimeter set to range higher than 22V ac, check for 22V ac at receptacle.

If 22V ac is present, replace light bulb (h10).

If 22V ac is not present, replace receptacle (para 2-93).

2. SHEET COUNTER IS ON AND DOES NOT OPERATE.

WARNING

HIGH VOLTAGE

- Do not operate printing press until you are sure TSS Press Section is connected to a suitable ground. Failure to do so may result in death or serious injury.

Table 2-5. Organizational Troubleshooting (cont).

Malfunction
Test or inspection
Corrective action

---

2. SHEET COUNTER IS ON AND DOES NOT OPERATE.

WARNING

HIGH VOLTAGE

- Shut off power source before attempting to disconnect, service, or connect wires or cables. Failure to do so may result in death or serious injury.
- When working on high-voltage components, always have an additional person present, and keep one hand away from equipment to reduce hazard of current flowing through vital organs of body. Remove all jewelry from fingers, wrists, and neck prior to working on electrical components. Failure to do so may result in death or serious burns.

Step 1. Turn external power source to press ON and printing press main power switch to ON.

Step 2. Turn on sheet counter.

NOTE

To close limit switch (b141), position blanket cylinder gap so it faces delivery gripper cover.

Step 3. Using a multimeter set to range higher than 24V dc – 50V dc, check for 24V dc between contactor (d14) point 14 and line 707 on terminal strip.

If power is present, go to step 6.

If no power is present, go to step 4.

Step 4. Using a multimeter set to range higher than 28V ac, check for 28V ac at input side to rectifier.

If no power is present, go to step 5.

If power is present, go to step 6.

Table 2-5. Organizational Troubleshooting (cont).

Malfunction

Test or inspection

Corrective action

---

2. SHEET COUNTER IS ON AND DOES NOT OPERATE (cont).

Step 5. Using a multimeter set to ohms scale, check fuse (e5) for continuity.

If continuity is present, go to step 6.

If no continuity is present, replace fuse (e5) (para. 2-93).

Step 6. Using a multimeter set to range higher than 24V dc, check for 24V dc on output side of rectifier.

If no power is present, replace rectifier (para. 2-93).

If power is present, replace limit switch (b141) (figure FO-1).

Step 7. With one person depressing relay button relay (d14) and other person using a multimeter set to range higher than 24V dc, check for 24V dc at sheet counter on/off switch.

If no power is present, replace sheet counter (para. 2-94).

If power is present, replace switch (para. 2-94).

3. MAIN POWER CONTROL LIGHT LIGHTS, BUT MAIN DRIVE MOTOR (ml) DOES NOT OPERATE WHEN OPERATION PUSHBUTTON (b14) IS PRESSED.

WARNING

HIGH VOLTAGE

- Do not operate printing press until you are sure TSS Press Section is connected to a suitable ground. Failure to do so may result in death or serious injury.
- Shut off power source before attempting to disconnect, service, or connect wires or cables. Failure to do so may result in death or serious injury.
- When working on high-voltage components, always have an additional person present, and keep one hand away from equipment to reduce hazard of current flowing through vital organs of body. Remove all jewelry from fingers, wrists, and neck prior to working on electrical components. Failure to do so may result in death or serious burns.

Table 2-5. Organizational Troubleshooting (cont).

Malfunction
Test or inspection
Corrective action

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3. MAIN POWER CONTROL LIGHT LIGHTS, BUT MAIN DRIVE MOTOR (ml) DOES NOT OPERATE WHEN OPERATION PUSHBUTTON (b14) IS PRESSED (cont).

Step 1. Set SAFETY STOP PUSHBUTTONS and MACHINE SAFE PUSHBUTTONS to proper operating positions. Ensure that cylinder guard switch (b135), deflector safety limit switch (b30), ink unit safety guard switch (b26), form roller limit switch (b31), and plexiguard limit switch (b42) are in operate position to allow press to run.

Step 2. Using a multimeter set to range higher than 120V ac, check for 120V ac between input side of fuses (e3) and ground (refer to figure FO-1).

If power is present, go to step 4.

If no power is present, go to step 3.

Step 3. Turn main power switch OFF. Using a multimeter set to ohms scale, check continuity of wire between main power switch and fuses (e3).

If continuity is present, check that main panel breakers are ON.

If no continuity, replace wiring.

Step 4. Using a multimeter set to range higher than 120V ac, check for 120V ac between output side of fuses (e3) and ground (figure FO-1).

If power is present, go to step 5.

If no power is present replace fuses (e3) (para. 2-93).

Step 5. Using a multimeter set to range higher than 120V ac, check for 120V ac between point L1 of input side of contactor (c2) and ground, and repeat for points L2 and L3.

If power is present, go to step 6.

If no power is present, replace wiring (figure FO-1).

Table 2-5. Organizational Troubleshooting (cont).

Malfunction

Test or inspection

Corrective action

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3. MAIN POWER CONTROL LIGHT LIGHTS, BUT MAIN DRIVE MOTOR (ml) DOES NOT OPERATE WHEN OPERATION PUSHBUTTON (b14) IS PRESSED (cont).

Step 6. Using a multimeter set to ohms scale, perform continuity check on OPERATION pushbutton (b14).

If continuity is present, go to step 7.

If no continuity is present, replace pushbutton (b14) (para. 2-94).

NOTE

To check for power between connections U1, V1, and W1, push contactor (c2) button.

Step 7. Using a multimeter set to range higher than 220V ac, check between U1 and V1, U1 and W1, and V1 and W1 on terminal strip for 220V ac.

If power is present, go to step 8.

If no power is present, replace wiring between contactor (c2) and terminal strip (figure FO-1).

NOTE

In order to perform the following step, belt guard (para. 2-17) must be removed.

Step 8. Using a multimeter set to range higher than 220V ac, check for 220V ac between connections U1 and V1, V1 and W1, and U1 and W1 of main motor (ml).

If power is present, go to step 9.

If no power is present, replace wiring between main motor and terminal strip (figure FO-1).

Step 9. Check main drive motor (ml) commutator and slipring brushes for dirt, damage, or excessive wear (para. 2-79). Remove dirt or debris. Replace damaged or worn brushes (para. 2-79). Check thermal overload device. If motor does not operate, replace motor (2-79).

Table 2-5. Organizational Troubleshooting (cont).

Malfunction

Test or inspection

Corrective action

---

4. FEEDER BOARD DOES NOT RAISE INTO POSITION.

WARNING

HIGH VOLTAGE

- Do not operate printing press until you are sure TSS Press Section is connected to a suitable ground. Failure to do so may result in death or serious injury.
- Shut off power source before attempting to disconnect, service, or connect wires or cables. Failure to do so may result in death or serious injury.
- When working on high-voltage components, always have an additional person present, and keep one hand away from equipment to reduce hazard of current flowing through vital organs of body. Remove all jewelry from fingers, wrists, and neck prior to working on electrical components. Failure to do so may result in death or serious burns.

Step 1. Visually check for mechanical binding of chains, sprockets, or guides of pile lift mechanism.

Adjust, repair, or replace components (para. 2-90).

Step 2. Turn panel breakers and main power switch ON. Check that feeder motor circuit breaker is ON. Press contactor (c5a) button in.

If motor does not operate, go to step 3.

If motor operates, go to step 4.

NOTE

Main pile up pushbutton must be pressed to perform this step.

Step 3. Using a multimeter set to range higher than 24V dc, check for 24V dc at point 161 and negative (–) on terminal strip.

If power is present, go to step 4.

If power is not present, replace main pile feeder brake (s7), (figure FO-1 and para. 2-90).

Table 2-5. Organizational Troubleshooting (cont).

Malfunction

Test or inspection

Corrective action

---

4. FEEDER BOARD DOES NOT RAISE INTO POSITION (cont).

NOTE

Main pile up pushbutton must be pressed to perform this step.

Step 4. Turn printing press main power switch to OFF. Using a multimeter set to ohms range, perform continuity check on main pile up (b20) and main pile down (b21) switches.

If no continuity, replace defective switch (para. 2-94).

If continuity, go to step 5.

Step 5. Using a multimeter set to range higher than 115V ac, check for 115V ac between the points listed below for each motor protection switch.

a6: Point 13 and Point 14

a8: Point 13 and Point 14

a40: Point 13 and Point 14

If no voltage is observed, replace the faulty switch (para 2-93).

If voltage is observed, go to step 6.

Step 6. Using a multimeter set to range higher than 115V ac, check for 115V ac between the points listed below for each component in the limit switch circuit.

Contactor c5a: Point A1 and Point A2

Limit Switch b87: Point 156 and Point 170

Limit Switch b36: Point 123 and Point 156

Safety Limit Switch b89: Point 123 and Point 126

Safety Limit Switch b90: Point 47 and Point 126

If no voltage is observed, replace the faulty component (para. 2-89).

If voltage is observed, go to step 7.

Table 2-5. Organizational Troubleshooting (cont).

Malfunction
Test or inspection
Corrective action

---

4. FEEDER BOARD DOES NOT RAISE INTO POSITION (cont).

NOTE

Step 7 requires one person to depress main pile up pushbutton during performance.

Step 7. Using a multimeter set to range higher than 115V ac, check for 115V ac between the points listed below for each component.

Contactor c5: Point A1 and Point A2

Relay d227: Point 13 and Point 14

Contactor c6: Point 21 and Point 22

Contactor c5a: Point 13 and Point 14

Relay d103: Point 21 and Point 22

Relay d107: Point 71 and Point 72

If no voltage is observed, replace the faulty component (para. 2-93).

If voltage is observed, replace pile lift motor (para. 2-90).

NOTE

Use same procedure for auxiliary pile motor circuit. Refer to figure FO-1 for associated components and test points.

5. FEEDER BOARD DOES NOT LOWER INTO POSITION.

WARNING

HIGH VOLTAGE

- Do not operate printing press until you are sure TSS Press Section is connected to a suitable ground. Failure to do so may result in death or serious injury.
- Shut off power source before attempting to disconnect, service, or connect wires or cables. Failure to do so may result in death or serious injury.

Table 2-5. Organizational Troubleshooting (cont).

Malfunction

Test or inspection

Corrective action

---

5. FEEDER DOES NOT LOWER INTO POSITION (cont).

WARNING

HIGH VOLTAGE

- When working on high-voltage components, always have an additional person present, and keep one hand away from equipment to reduce hazard of current flowing through vital organs of body. Remove all jewelry from fingers, wrists, and neck prior to working on electrical components. Failure to do so may result in death or serious burns.

Step 1. Visually check for mechanical binding of chains, sprockets, or guides.

Adjust, repair, or replace components (para. 2-89).

Step 2. Turn panel breakers and main power switch ON. Check that feeder motor circuit
breaker is ON. Press contactor (c5a) button in.

If motor does not operate, go to step 3.

If motor operates, go to step 4.

NOTE

Main pile up pushbutton must be pressed to perform this step.

Step 3. Using a multimeter set to range higher than 24V dc, check for 24V dc at point 161
and negative (–) on terminal strip.

If power is present, go to step 4.

If power is not present, replace main pile feeder brake (s7) (figure FO-1 and para. 2-90).

NOTE

Main pile up pushbutton must be pressed to perform this step.

Table 2-5. Organizational Troubleshooting (cont).

Malfunction
Test or inspection
Corrective action

---

5. FEEDER BOARD DOES NOT LOWER INTO POSITION (cont).

Step 4. Turn printing press main power switch to OFF. Using a multimeter set to ohms range, perform continuity check on main pile up (b20) and main pile down (b21) switches.

If no continuity, replace defective switch (para. 2-94).

If continuity, go to step 5.

Step 5. Using a multimeter set to range higher than 115V ac, check for 115V ac between the points listed below for each motor protection switch.

a6: Point 13 and Point 14

a8: Point 13 and Point 14

a40: Point 13 and Point 14

If no voltage is observed, replace the faulty switch (para. 2-93).

If voltage is observed, go to step 6.

Step 6. Using a multimeter set to range higher than 115V ac, check for 115V ac between the points listed below for each component in the limit switch circuit.

Contactor c6: Point 13 and Point 14

Limit Switch b37: Point 50 and Point 51

Limit Switch b274: Point 50 and Point 50a

If no voltage is observed, replace the faulty component (paragraphs 2-89, 2-93).

If voltage is observed, go to step 7.

NOTE

Step 7 requires one person to depress main pile up pushbutton during performance.

Step 7. Using a multimeter set to range higher than 115V ac, check for 115V ac between the points listed below for each component.

Contactor c6: Point A1 and Point A2

Table 2-5. Organizational Troubleshooting (cont).

Malfunction
Test or inspection
Corrective action

---

5. FEEDER BOARD DOES NOT LOWER INTO POSITION (cont).

Relay d228: Point 13 and Point 14

Contactor c5: Point 21 and Point 22

If no voltage is observed, replace the faulty component (para. 2-93).

If voltage is observed, replace pile lift motor (para 2-90).

NOTE

Use same procedure for auxiliary pile motor circuit. Refer to figure FO-1 for associated components and test points.

6. FEEDER BOARD WILL MOVE UP WHEN MAIN PILE UP PUSHBUTTON (b20) IS PRESSED, BUT WILL NOT MOVE UP AUTOMATICALLY.

WARNING

HIGH VOLTAGE

- Do not operate printing press until you are sure TSS Press Section is connected to a suitable ground. Failure to do so may result in death or serious injury.
- Shut off power source before attempting to disconnect, service, or connect wires or cables. Failure to do so may result in death or serious injury.
- When working on high-voltage components, always have and additional person present, and keep one hand away from equipment to reduce hazard of current flowing through vital organs of body. Remove all jewelry from fingers, wrists, and neck prior to working on electrical components. Failure to do so may result in death or serious burns.

Step 1. Inspect actuating lever on transfer switch (b86).

If lever is bent or broken, repair or replace switch (b86) (para. 2-89).

If switch is physically intact, go to step 2.

Step 2. Lower feeder pile below transfer switch. Raise pile to transfer switch.

If pile stops at transfer switch, go to step 3.

If pile does not stop, replace transfer switch (b86) (para. 2-89).

Table 2-5. Organizational Troubleshooting (cont).

Malfunction
Test or inspection
Corrective action

---

6. FEEDER BOARD WILL MOVE UP WHEN MAIN PILE UP PUSHBUTTON (b20) is PRESSED, BUT WILL NOT MOVE UP AUTOMATICALLY (cont).

Step 3. Turn printing press main power switch OFF. Using a multimeter set to ohms scale, check for continuity of components between points listed.

Limit switch (b92): Point 47 and Point 120

Relay (d107): Point 51 and Point 52

Relay (d103): Point 33 and Point 34

If no continuity is observed, replace the faulty component (paragraphs 2-89, 2-93).

If continuity is observed, check continuity of wiring between components.

7. FEEDER WILL NOT OPERATE WHEN FEEDER ON PUSHBUTTON IS PRESSED.

WARNING

HIGH VOLTAGE

- Do not operate printing press until you are sure TSS Press Section is connected to a suitable ground. Failure to do so may result in death or serious injury.
- Shut off power source before attempting to disconnect, service, or connect wires or cables. Failure to do so may result in death or serious injury.
- When working on high-voltage components, always have an additional person present, and keep one hand away from equipment to reduce hazard of current flowing through vital organs of body. Remove all jewelry from fingers, wrists, and neck prior to working on electrical components. Failure to do so may result in death or serious burns.

Step 1. Check that Press Section panel breaker and main power switch are ON. Check
that feeder panel switch (b84) is ON.

Step 2. With FEEDER ON pushbutton pressed, using a multimeter set to ohms range,
check for continuity at points 146 and 150 on terminal strip.

If no continuity, replace FEEDER ON pushbutton (b84) (para. 2-94).

If continuity is present, go to step 3.

Table 2-5. Organizational Troubleshooting (cont).

Malfunction
Test or inspection
Corrective action

---

7. FEEDER WILL NOT OPERATE WHEN FEEDER ON PUSHBUTTON IS PRESSED (cont).

Step 3. Check quick disconnect plugs at electronic control box (u2).

If connections are loose or damaged, reconnect or replace.

If connections are tight, replace electronic control box (u2) (para. 2-92).

Step 4. Using a multimeter set at ohms range, check for continuity at points 13 and 14 of contactor d15.

If no continuity, replace contactor d15 (para. 2-93).

If continuity is present, go to step 5.

Step 5. With FEEDER ON pushbutton pressed, using a multimeter set to range higher than 24V dc, check for 24V dc at point 267 and negative (–) on terminal strip.

If power is not present, replace feeder coupling magnet (s21) on

electromagnetic clutch (2-88).

If power is present, go to step 6.

Step 6. Using a multimeter set to ohms range, check for continuity between the points listed below for each component.

Auxiliary Relay (d13a): Point 81 and Point 82, and Point 71 and Point 72.

Relay (d121): Point 31 and Point 32

Limit Switch (b30a): Point 31 of relay (d121) and Point 143 on terminal strip.

If no continuity is present, replace component (para. 2-93).

If continuity is present, go to step 7.

NOTE

For steps 7 and 8, insert continuous delivery rake.

Table 2-5. Organizational Troubleshooting (cont).

Malfunction

Test or inspection

Corrective action

---

7. FEEDER WILL NOT OPERATE WHEN FEEDER ON PUSHBUTTON IS PRESSED (cont).

Step 7. Using a multimeter set to ohms range, check for continuity between points listed below for each component.

Relay (d20): Point 43 and Point 44

Relay (d4): Point 13 and Point 14

Contactor (c1): Point 13 and Point 14

Relay (d13): Point 81 and Point 82

If continuity is present, replace faulty component (para. 2-93).

If no continuity is present, go to step 8.

Step 8. Using a multimeter set to ohms range, check for continuity between points listed below for each switch.

Feeder Stop pushbutton (b83): At wire junction Point E17 and Point E18.

Microswitch (b82): Point 29 and Point 143.

If continuity is present, replace faulty switch (para. 2-89).

If no continuity is present, go to step 9.

Step 9. Check wiring using schematic (figure FO-1).

Repair/replace wiring as required.

8. FEEDER BOARD MOVES UP, BUT SHEETS WILL NOT FEED FORWARD

WARNING

HIGH VOLTAGE

- Do not operate printing press until you are sure TSS Press Section is connected to a suitable ground. Failure to do so may result in death or serious injury.
- Shut off power source before attempting to disconnect, service, or connect wires or cables. Failure to do so may result in death or serious injury.

Table 2-5. Organizational Troubleshooting (cont).

Malfunction

Test or inspection

Corrective action

---

8. FEEDER BOARD MOVES UP, BUT SHEETS WILL NOT FEED FORWARD (cont).

WARNING

HIGH VOLTAGE

- **When working on high-voltage components, always have an additional person present, and keep one hand away from equipment to reduce hazard of current flowing through vital organs of body. Remove all jewelry from fingers, wrists, and neck prior to working on electrical components. Failure to do so may result in death or seriou burns.**

Step 1. Check that compressor ON-OFF switch is ON.

Step 2. Check synchronization of suction head to forwarding rollers (para. 2-85).

Adjust suction head timing (para. 2-85).

Step 3. Check manometer and vacuum gage on feeder side frame for low air output or low vacuum.

Clean compressor filters (TM 5-3610-286-10).

Step 4. Check suction head hose connections.

Tighten connections (para. 2-85).

Step 5. Check suction head hoses for cracks or breaks.

Replace hoses.

9. FEEDER AND SUCTION HEAD DO NOT RUN SMOOTHLY.

Step 1. Check for binding of chain or sprocket.

Adjust tension (para. 2-88).

Step 2. Visually check clearance between drive chain and chain guide.

Loosen screws in chain guide and position guide.

Step 3. Check drive chain to feeder for wear or expansion.

Remove master link and replace chain.

Table 2-5. Organizational Troubleshooting (cont).

Malfunction

Test or inspection

Corrective action

---

9. FEEDER AND SUCTION HEAD DO NOT RUN SMOOTHLY (cont).

Step 4. Ensure drive chain has proper lubrication.

Lubricate in accordance with LO 5-3610-286-12.

Step 5. Visually check chain sprockets for wear or damage.

Replace chain sprockets (para. 2-88).

10. FEEDER DOES NOT CUT OFF WHEN SHEETS ARE MISSING OR MISFED.

Check light barrier for cleanliness and proper adjustment. If problem continues, replace electronic control box (u2) (para. 2-92).

11. SHEETS FEED FORWARD, BUT ARE NOT GRIPPED CORRECTLY BY RANGER DRUM GRIPPERS.

WARNING

HIGH VOLTAGE

- Do not operate printing press until you are sure TSS Press Section is connected to a suitable ground. Failure to do so may result in death or serious injury.
- Shut off power source before attempting to disconnect, service, or connect wires or cables. Failure to do so may result in death or serious injury.
- When working on high-voltage components, always have an additional person present, and keep one hand away from equipment to reduce hazard of current flowing through vital organs of body. Remove all jewelry from fingers, wrists, and neck prior to working on electrical components. Failure to do so may result in death or serious burns.

Step 1. Check timing between feeder and press (TM 5-3610-286-10).

Step 2. Inspect ranger drum, head stop, grippers, and gripper bar.

Adjust and repair as needed (para. 2-67).

Table 2-5. Organizational Troubleshooting (cont).

Malfunction
Test or inspection
Corrective action

---

11. SHEETS FEED FORWARD, BUT ARE NOT GRIPPED CORRECTLY BY RANGER DRUM GRIPPERS (cont).

Step 3. Check cams and cam followers for wear and binding.

Replace worn or binding cam followers (para. 2-67). For badly worn cams refer to next higher level of maintenance.

Step 4. Check front lay adjustment (TM 5-3610-286-10) and external adjustments (para. 2-52).

Step 5. Check suction valve adjustment (if sheet hangs up) (TM 5-3610-286-10).

Step 6. Using a multimeter set to range higher than 115V ac, check for 115V ac between point 44 of contactor (c2) and point A1 of contactor (c21).

If power is present, go to step 7.

If no power is present, check that main power switch is ON.

Step 7. Check for proper operation of suction drum (m21). Using a multimeter set to ohms range, check for continuity between points listed below for each component.

Contactor (c2): Point 44 and Point 43 (press relay button)

Motor Protection Switch (a21): Point 13 and Point 14

Contactor (c21): Point A1 and Point A2

If no continuity is present, replace faulty component (para. 2-93).

If continuity is present, go to step 8.

Step 8. Check continuity of wiring to suction motor (m21) (figure FO-1).

If no continuity is present, repair wiring.

If continuity is present, replace suction motor (m21) (para. 2-48).

12. IMPRESSION CYLINDER DOES NOT GRIP PAPER PROPERLY.

Step 1. Check for damaged or missing components on impression cylinder.

Repair/replace components on impression cylinder (para. 2-70).

Table 2-5. Organizational Troubleshooting (cont).

Malfunction

Test or inspection

Corrective action

---

12. IMPRESSION CYLINDER DOES NOT GRIP PAPER PROPERLY (cont).

Step 2. Check for proper adjustment of grippers and adjust if required (para. 2-70).

Replace gripper pads (para. 2-70).

Step 3. Check front lay alignment (TM 5-3610-286-10).

Step 4. Inspect ranger drum, head strap, grippers and gripper bar.

Adjust and repair as needed (para. 2-67).

13. PRINTING PRESS DOES NOT PRINT WHEN IMPRESSION ON/FEEDER ON PUSHBUTTON (b70) IS PRESSED.

WARNING

HIGH VOLTAGE

- Do not operate printing press until you are sure TSS Press Section is connected to a suitable ground. Failure to do so may result in death or serious injury.
- Shut off power source before attempting to disconnect, service or connect wires or cables. Failure do so may result in death or serious injury.
- When working on high-voltage components, always have an additional person present, and keep one hand away from equipment to reduce hazard of current flowing through vital organs of body. Remove all jewelry from fingers, wrists, and neck prior to working on electrical components. Failure to do so may result in death or serious burns.

NOTE

The following procedure is the same for the PRODUCTION pushbutton (b71). The only difference is at steps 5 and 8 at which point perform the function using the PRODUCTION pushbutton (b71).

Step 1. Check for paper at front lay.

If no paper, check feeder.

If paper is found at front lay, go to step 2.

Table 2-5. Organizational Troubleshooting (cont).

Malfunction

Test or inspection

Corrective action

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13. PRINTING PRESS DOES NOT PRINT WHEN IMPRESSION ON/FEEDER ON PUSHBUTTON (b70) IS PRESSED (cont).

Step 2. With press running and feeder on, ensure relay (d11) is energized.

If relay (d11) is not energized, go to step 3.

If relay (d11) is energized, go to step 5.

Step 3. Using a multimeter set to ohms range, check for continuity at points A1 and A2 of relay (d11).

If continuity is present, go to step 4.

If no continuity is present, replace relay (d11) (para. 2-93).

Step 4. Replace light barriers and run press as in step 2.

If relay (d11) is not energized, check electronic control box (u2) and its quick disconnect plugs (para. 2-92).

NOTE

For step 5, the operator should run the press while the maintenance person watches relay button (d15).

Step 5. With press running, press IMPRESSION ON/FEEDER ON pushbutton (b70).

If relay button activates, go to step 6.

If relay button activates and deactivates, go to step 7.

If relay button does not activate, go to step 8.

Step 6. Using a multimeter set to ohms range, check for continuity between points 23 and 24, and points 33 and 34, of relay (d14).

If continuity is present, repair or replace impression electromagnet (s10) (para. 2-68).

If no continuity is present, replace relay (d14) (para. 2-93).

Table 2-5. Organizational Troubleshooting (cont).

Malfunction
Test or inspection
Corrective action

---

13. PRINTING PRESS DOES NOT PRINT WHEN IMPRESSION ON/FEEDER ON PUSHBUTTON (b70) IS PRESSED (cont).

Step 7. Using a multimeter set to ohms range, check for continuity between points listed for the following relays.

Relay (d13a): Point 61 and Point 62

Relay (d18): Point 21 and Point 22

Relay (d15): Point 33 and Point 34

If continuity is present, go to step 9.

If no continuity is present, replace faulty relay (para. 2-93).

NOTE

On relay (d5), relay button must be pressed to take reading.

Step 8. Using a multimeter set to ohms range, check for continuity at points A1 and A2 of relay (d15) and points 33 and 34 of relay (d5).

If continuity is present, replace IMPRESSION ON/FEEDER ON pushbutton (b70) (para. 2-94).

If no continuity is present, replace defective relay.

Step 9. Check wiring using schematic (figure FO-1).

Replace wiring (figure FO-1).

Step 10. Check for proper operation of blanket-to-impression cylinder micro adjustment.

Readjust (TM 5-3610-386-10). If not sufficient readjust (para. 2-75. If not adjustable, repair or replace blanket-to-impression cylinder micro adjustment (bearer-pressure adjuster) (para. 2-75).

Table 2-5. Organizational Troubleshooting (cont).

Malfunction
Test or inspection
Corrective action

14. DELIVERY GRIPPER BARS DO NOT GRIP PAPER PROPERLY.

Step 1. Check for proper adjustment of delivery grippers.

Adjust grippers (para. 2-57).

Step 2. Check for proper timing to impression cylinder.

Adjust timing (para. 2-57).

Step 3. Check for damaged or missing components of delivery grippers.

Replace delivery grippers (para. 2-57).

15. DELIVERY PILE BOARD WILL NOT LOWER AUTOMATICALLY.

WARNING

HIGH VOLTAGE

- Do not operate printing press until you are sure TSS Press Section is connected to a suitable ground. Failure to do so may result in death or serious injury.
- Shut off power source before attempting to disconnect, service or connect wires or cables. Failure to do so may result in death or serious injury.
- When working on high-voltage components, always have an additional person present, and keep one hand away from equipment to reduce hazard of current flowing through vital organs of body. Remove all jewelry from fingers, wrists, and neck prior to working on electrical components. Failure to do so may result in death or serious burns.

Step 1. Adjust delivery pile transport (para. 2-64).

If delivery pile board still will not lower automatically, go to step 2.

Step 2. Press delivery pile down pushbutton (b23).

If delivery pile board lowers, go to step 3.

If delivery pile board does not lower, go to step 5.

Table 2-5. Organizational Troubleshooting (cont).

Malfunction

Test or inspection

Corrective action

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15. DELIVERY PILE BOARD WILL NOT LOWER AUTOMATICALLY (cont).

Step 3. Using a multimeter set to ohms range, check for continuity between points listed for the following components.

Relay (d11): Point 33 and Point 34

Relay (d103): Point 43 and Point 44

Contactor (c9): Point 13 and Point 14

Relay (d107): Point 81 and Point 82

If no continuity is present, replace faulty relay or contactor (para. 2-93).

Step 4. Using a multimeter set to ohms range, check for continuity between point 13 of contactor (c9) and point (92a) or (93) of terminal strip.

If continuity is present, go to step 9.

If no continuity is present, replace defective limit switch (b80) (para. 2-64).

Step 5. Using a multimeter set to range higher than 115V ac, check for 115V ac at points U5, V5, and W5 of terminal strip and ground with contactor (c7) or (c8) relay button pressed.

If power is present, go to step 6.

If no power is present, go to step 8.

Step 6. Using a multimeter set to ohms range, check for continuity between points listed for the following relays.

Relay (d229): Point A1 to Point A2, Point 33 to Point A34, and Point 43 to Point 44.

Relay (d230): Point A1 to Point A2, Point 33 to Point A34, and Point 43 to Point 44.

If continuity is present, go to step 7.

If no continuity is present, replace faulty relay (d229 and/or d230). (para. 2-93).

Table 2-5. Organizational Troubleshooting (cont).

Malfunction

Test or inspection

Corrective action

---

15. DELIVERY PILE BOARD WILL NOT LOWER AUTOMATICALLY (cont).

Step 7. Using a multimeter set to ohms range, check for continuity at points 220 and negative (–) on terminal strip.

If continuity is present, go to step 10.

If no continuity is present, replace brake delivery electromagnet (s9) (para. 2-64).

Step 8. Using a multimeter set to range higher than 120V ac, check for 120V ac between points L1 and L2, L1 and L3, and L2 and L3 of motor protection switch (a8).

If power is present, go to step 9.

If power is not present, replace motor protection switch (a8) (para. 2-93).

Step 9. Using a multimeter set to ohms range, check for continuity between points listed for the following contactors.

Contactor (c7): Point 21 and Point 22, Point A1 and Point A2.

Contactor (c8): Point 21 and Point 22, Point A1 and Point A2.

If continuity is present, go to step 10.

If no continuity is present, replace defective contactors (c8 and/or c7) (para. 2-93).

Step 10. Check wiring using schematic (figure FO-1).

Replace defective wiring.

16. DELIVERY PILE BOARD WILL NOT RAISE.

WARNING

HIGH VOLTAGE

- Do not operate printing press until you are sure TSS Press Section is connected to a suitable ground. Failure to do so may result in death or serious injury.
- Shut off power source before attempting to disconnect, service, or connect wires or cables. Failure to do so may result in death or serious injury.

Table 2-5. Organizational Troubleshooting (cont).

Malfunction

Test or inspection

Corrective action

---

16. DELIVERY PILE BOARD WILL NOT RAISE (cont).

WARNING

HIGH VOLTAGE

- When working on high-voltage components, always have another person present, keep one hand away from equipment to reduce hazard of current flowing through vital organs of body. Remove all jewelry from fingers, wrists, and neck prior to working on electrical components. Failure to do so may result in death or serious burns.

Step 1. Check chain and sprocket drive for binding, wear, broken or damaged parts.

Repair or replace (para. 2-64).

Step 2. Check for bound or frozen delivery pile motor.

Replace motor (m5) (para. 2-64).

Step 3. Press pile down pushbutton (b23).

If pile lowers, go to step 4.

If pile does not lower, go to step 7.

Step 4. Using a multimeter set to ohms range, check for continuity at points 21 and 22 of pile up pushbutton (b22) and pile down pushbutton (b23) and points 13 and 14 of pile up pushbutton (b22) and pile down pushbutton (b23).

If continuity is present, go to step 5.

If no continuity is present, replace faulty pushbutton (para. 2-94).

NOTE

In step 5, perform continuity tests in sequence of listed components.

Step 5. Using a multimeter set to ohms range, check for continuity between the points listed below for the following components.

Limit switch (b209): Across switch terminals

Limit switch (b39): Across switch terminals

Relay (d59): Points 43 and Point 44, Point A1 and Point A2 (with relay button pressed)

Table 2-5. Organizational Troubleshooting (cont).

Malfunction

Test or inspection

Corrective action

---

16. DELIVERY PILE BOARD WILL NOT RAISE (cont).

Step 5. (cont)

Limit switch (b59): Across switch terminals

Contactor (c8): Point 21 and Point 22

Relay (d229): Point 13 and Point 14, Point A1 and Pont A2 (with relay button pressed)

Contractor (c7): Point A1 and Point A2

If no continuity is present, replace faulty component (paragraphs 2-93 and 2-89).

If continuity is present, go to step 6.

Step 6. Check wiring using schematic (figure FO-1).

Replace defective wiring.

Step 7. Using a multimeter set to ranger higher than 220V ac, check for 220V ac between point U5 of terminal strip and ground with contactor (c7) relay button pressed. Repeat same procedure for V5 and W5 of terminal strip.

If power is present, go to step 8.

If no power is present, go to step 8.

Step 8. Using a multimeter set to ohms range, check for continuity between points listed for following relays.

Relay (d229): Point A1 and Point A2, Point 33 and Point 34, Point 43 and Point 44.

Relay (d230): Point A1 and Point A2, Point 33 and Point 34, Point 43 and Point 44.

If continuity is present, go to step 9.

If no continuity is present, replace faulty relay(s) (d229)/(d230) (para. 2-93).

Table 2-5. Organizational Troubleshooting (cont).

Malfunction

Test or inspection

Corrective action

16. DELIVERY PILE BOARD WILL NOT RAISE (cont).

Step 9. Using a multimeter set to ohms range, check for continuity between points 220 and negative (–) on terminal strip.

If continuity is present, go to step 10.

If no continuity is present, replace delivery brake electromagnet (s9) (para. 2-64).

Step 10. Using a multimeter set to range higher than 220V ac, check for 220V ac between points L1 and L2, L2 and L3, and L1 and L3 of motor protection switch (a8).

If power is present, go to step 5 to recheck contactor (c7).

If no power is present, replace motor protection switch (a8) (para. 2-93).

17. DELIVERY PILE BOARD WILL NOT LOWER.

WARNING

HIGH VOLTAGE

- Do not operate printing press until you are sure TSS Press Section is connected to a suitable ground. Failure to do so may result in death or serious injury.
- Shut off power source before attempting to disconnect, service, or connect wires or cables. Failure to do so may result in death or serious injury.
- When working on high-voltage components, always have another person present, and keep one hand away from equipment to reduce hazard of current flowing through vital organs of body. Remove all jewelry from fingers, wrists, and neck prior to working on electrical components. Failure to do so may result in death or serious burns.

Step 1. Check chain and sprocket drive for binding, wear, broken or damaged parts.

Repair or replace (para. 2-64).

Step 2. Check for bound or frozen delivery pile motor.

Replace motor (m5) (para. 2-64).

Table 2-5. Organizational Troubleshooting (cont).

Malfunction
Test or inspection
Corrective action

---

17. DELIVERY PILE BOARD WILL NOT LOWER (cont).

Step 3. Press pile up pushbutton (b23).

If pile raises, go to step 4.

If pile does not raise, go to step 7.

NOTE

Pushbuttons must be depressed when performing step 4.

Step 4. Using a multimeter set to ohms range, check for continuity at points 21 and 22 of pile up pushbutton (b22) and pile down pushbutton (b23) and points 13 and 14 of pile up pushbutton (b22) and pile down pushbutton (b23).

If continuity is present, go to step 5.

If no continuity is present, replace faulty pushbutton (para. 2-94).

NOTE

In step 5, perform continuity tests in sequence of listed components.

Step 5. Using a multimeter set to ohms range, check for continuity between the points listed below for the following components.

Limit switch (b37a): Across switch terminals

Relay (d121): Point A1 and Point A2, Point 43 and Point 44

Contactor (c7): Point A1 and Point A2, Point 21 and Point 22

Relay (d230): Point A1 and A2, Point 13 and Point 14

Contactor (c8): Point A1 and A2

If no continuity is present, replace faulty component (paragraphs 2-93 and 2-89).

If continuity is present, go to step 6.

Step 6. Check wiring using schematic (figure FO-1).

Replace defective wiring.

Table 2-5. Organizational Troubleshooting (cont).

Malfunction

Test or inspection

Corrective action

---

17. DELIVERY PILE BOARD WILL NOT LOWER (cont).

Step 7. Using a multimeter set to range higher than 220V ac, check for 220V ac between points U5, V5, W5, and ground with contactor (c8) relay button pressed.

If power is present, go to step 8.

If no power is present, go to step 10.

Step 8. Using a multimeter set to ohms range, check for continuity between points listed for the following relays.

Relay (d229): Point 33 and Point 34, Point 43 and Point 44

Relay (d230): Point 33 and Point 34, Point 43 and Point 44

If continuity is present, go to step 9.

If continuity is not present, replace relay(s) (d230 and/or d299) (para. 2-93).

Step 9. Using a multimeter set to ohms range, check for continuity between points (220) and negative (–) on terminal strip.

If continuity is present, go to step 10.

If no continuity is present, replace delivery brake electromagnet (s9) (para. 2-64).

Step 10. Using a multimeter set to range greater than 220V ac, check volts between L1 and L2, L2 and L3, and L1 and L3 motor protection switch (a8).

If 220V ac is present, go to step 5 to recheck contactor (c8).

If 220V ac is not present, replace motor protection switch (a8) (para. 2-93).

Table 2-5. Organizational Troubleshooting (cont).

Malfunction
Test or inspection
Corrective action

18. DELIVERY LIGHT DOES NOT OPERATE.

WARNING

HIGH VOLTAGE

- Do not operate printing press until you are sure TSS Press Section is connected to a suitable ground. Failure to do so may result in death or serious injury.
- Shut off power source before attempting to disconnect, service, or connect wires or cables. Failure to do so may result in death or serious injury.
- When working on high-voltage components, always have another person present, and keep one hand away from equipment to reduce hazard of current flowing through vital organs of body. Remove all jewelry from fingers, wrists, and neck prior to working on electrical components. Failure to do so may result in death or serious burns.

Step 1. Visually check fluorescent light for darkened color or breakage.

Replace fluorescent light (TM 5-3610-286-10).

Step 2. Check starter (m9) for serviceability.

Replace starter (m9) (TM 5-3610-286-10).

Step 3. Using a multimeter set to range higher than 220V ac, check for 220V ac between points L2 and L11.

If power is present, go to step 4.

If no power is present, go to step 7.

Step 4. Using a multimeter set to range higher than 220V ac, check for 220V ac between points L1 and L11.

If power is present, go to step 5.

If no power is present, replace fuse (e14).

Table 2-5. Organizational Troubleshooting (cont).

Malfunction

Test or inspection

Corrective action

---

18. DELIVERY LIGHT DOES NOT OPERATE (cont).

Step 5. Using a multimeter set to ohms range, check for continuity across starter (m9).

If continuity is present, go to step 6.

If no continuity is present, replace starter (m9) (TM 5-3610-286-10).

Step 6. Using a multimeter set to ohms range, check for continuity at blackout switch.

If continuity is present, go to step 7.

If no continuity is present, replace blackout switch (para. 2-93).

Step 7. Using a multimeter set to range higher than 220V ac, check for 220V ac at points 0 and 220 on transformer (m6).

If power is present, go to step 8.

If no power is present, replace transformer (m6) (para. 2-93).

Step 8. Check wiring using schematic (figure FO-1).

If wiring is good, replace light fixture (para. 2-54).

If wiring is not good, replace wiring.

19. STATIC ELIMINATOR DOES NOT OPERATE.

WARNING

HIGH VOLTAGE

- Do not operate printing press until you are sure TSS Press Section is connected to a suitable ground. Failure to do so may result in death or serious injury.
- Shut off power source before attempting to disconnect, service, or connect wires or cables. Failure to do so may result in death or serious injury.
- When working on high-voltage components, always have another person present, and keep one hand away from equipment to reduce hazard of current flowing through vital organs of body. Remove all jewelry from fingers, wrists, and neck prior to working on electrical components. Failure to do so may result in death or serious burns.

Table 2-5. *Organizational Troubleshooting (cont).*

Malfunction

Test or inspection

Corrective action

---

19. STATIC ELIMINATOR DOES NOT OPERATE (cont).

Step 1. Check that compressor is running.

If not running, check compressor switch.

If running, go to step 2.

Step 2. With main power on, compressor on, and power unit of static eliminator on, check that light at power unit is lit.

If light is not lit, go to step 2.

If light is lit, replace static eliminator bar (para. 2-83).

Step 3. With main power on, compressor on, and power unit of static eliminator on, use a multimeter set to range higher than 220V ac to check for 220V ac at power unit power unit light receptacle terminals.

If power is present, replace light at power unit (para. 2-83).

If no power is present, go to step 4.

Step 4. With main power on, compressor on, and power unit of static eliminator on, use a multimeter set to range higher than 220V ac to check for 220V ac at points 1 and 2 of power unit input terminal.

If power is present, replace power unit (para. 2-83).

If no power is present, go to step 5.

Step 5. Using a multimeter set to range higher than 220V ac, check for 220V ac at points 0 and 220 on transformer (m60).

If power is present, go to step 6.

If no power is present, replace transformer (m6) (para. 2-93).

Step 6. Using a multimeter set to range higher than 220V ac, check for 220V ac at points L2 and L11 of terminal strip.

If power is present, go to step 7.

If power is not present, check wiring using schematic (figure FO-1).

Table 2-5. Organizational Troubleshooting (cont).

Malfunction
Test or inspection
Corrective action

19. STATIC ELIMINATOR DOES NOT OPERATE (cont).

Step 7. Using a multimeter set to range higher than 220V ac, check for 220V ac at points L1 and L2 of terminal strip.

If power is present, go to step 8.

If power is not present, replace fuse (e14) (para. 2-93).

Step 8. Using a multimeter set to ohms range, depress contactor (c11) button and check for continuity at points 13 and 14 and points A1 and A2 of contactor (c11).

If continuity is present, replace static eliminator power unit (para. 2-83).

If no continuity is present, replace contactor (c11) (para. 2-93).

20. IMPRESSIONS PER HOUR GAGE DOES NOT OPERATE.

WARNING

HIGH VOLTAGE

- Do not operate printing press until you are sure TSS Press Section is connected to a suitable ground. Failure to do so may result in death or serious injury.
- Shut off power source before attempting to disconnect, service, or connect wires or cables. Failure to do so may result in death or serious injury.
- When working on high-voltage components, always have another person present, and keep one hand away from equipment to reduce hazard of current flowing through vital organs of body. Remove all jewelry from fingers, wrists, and neck prior to working on electrical components. Failure to do so may result in death or serious burns.

Step 1. Start press and run at idle speed (2000 impressions per hour). Using a multimeter set to milliamps range (mA), check for 1.5 milliamps between terminals 505 and 565 of tacho dynamo (g7).

If correct reading is obtained, go to step 2.

If incorrect amperage is present, replace tacho dynamo (para. 2-61).

Table 2-5. Organizational Troubleshooting (cont).

Malfunction
    Test or inspection
        Corrective action

---

20. IMPRESSIONS PER HOUR GAGE DOES NOT OPERATE (cont).

Step 2. With printing press running at 2000 impressions per hour, using a multimeter set to milliamps range (mA), check for 1.5 milliamps across terminals 2 and 3 of impressions per hour meter (g3).

If reading is not 1.5 milliamps, go to step 3.

If reading is 1.5 milliamps, replace impressions per hour meter is faulty. Refer to next higher maintenance.

Step 3. Check wiring using schematic (figure FO-1).
Repair/replace wiring (figure FO-1).

21. VACUUM GAGE INDICATES LOW OR NO VACUUM.

Step 1. Remove line from vacuum gage and start compressor; check for vacuum.
If no vacuum is present, go to step 2.

If vacuum is present, vacuum gage is faulty. Refer to next higher maintenance.

Step 2. Remove vacuum line from compressor and start compressor; check for vacuum.

If no vacuum is present, go to step 3.

If vacuum is present, replace vacuum line.

Step 3. Check compressor for low oil level (oil lubricated compressor only).

Add oil (refer to LO 5-3610-286-10).

Step 4. Check compressor for dirty filters.

Clean filters (TM 5-3610-286-10).

Step 5. Recheck vacuum from compressor.

If vacuum remains low, or no vacuum, check compressor for binding or dirt before replacing (para. 2-91).

22. AIR BLAST GAGE INDICATES LOW OR NO PRESSURE.

Step 1. Check that filter cartridges on compressor are not clogged or defective.

Service or replace filter cartridges (TM 5-3610-286-10).

Table 2-5. Organizational Troubleshooting (cont).

Malfunction

Test or inspection

Corrective action

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22. AIR BLAST GAGE INDICATES LOW OR NO PRESSURE (cont).

Step 2. Check that air lines are serviceable.

Replace faulty air lines.

Step 3. Remove air line from pressure gage and start compressor; check for proper airflow.

If airflow is present, pressure gage is faulty. Refer to next higher maintenance.

If airflow is low or no pressure is present, check compressor for binding or dirt before replacing (para. 2-91).

23. PRINTING PRESS DOES NOT STOP IMMEDIATELY (COASTS) WHEN SAFETY STOP PUSHBUTTON IS PRESSED.

WARNING

HIGH VOLTAGE

- Do not operate printing press until you are sure TSS Press Section is connected to a suitable ground. Failure to do so may result in death or serious injury.
- Shut off power source before attempting to disconnect, service, or con- wires or cables. Failure to do so may result in death or serious injury.
- When working on high-voltage components, always have another person present, and keep one hand away from equipment to reduce hazard of current flowing through vital organs of body. Remove all jewelry from fingers, wrists, and neck prior to working on electrical components. Failure to do so may result in death or serious burns.

Step 1. Check drive belt for wear and proper adjustment.

If belt is worn or not properly adjusted, adjust or relace drive belt (para. 2-80).

If belt is good, go to step 2.

Step 2. Check that main motor brake is not hung up in release position.

If condition persists, refer to next higher level of maintenance.

Table 2-5. Organizational Troubleshooting (cont).

Malfunction
Test or inspection
Corrective action

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23. PRINTING PRESS DOES NOT STOP IMMEDIATELY (COASTS) WHEN SAFETY STOP PUSHBUTTON IS PRESSED (cont).

Step 3. Using multimeter set to ohms range, check continuity between Point F6 and Point F16 on brake main motor limit switch (b50).

If no continuity is present, limit switch (b50) is faulty. Refer to next higher level of maintenance.

If continuity is present, main motor brake is faulty. Refer to next higher level of maintenance.

24. PRINTING PRESS DOES NOT STOP WHEN CYLINDER GUARD IS REMOVED.

Using a multimeter set to ohms scale, check for shorted cylinder guard switch (b135) between Point 243 and Point 244, using current path 77 (figure FO-1).

Replace shorted cylinder guard switch (b135) (para. 2-65).

25. PRINTING PRESS DOES NOT STOP WHEN SAFETY GUARD OR FINGER SAFETY GUARD IS TRIPPED.

Using a multimeter set to ohms scale, check ink unit finger safety guard switch (b30) and ink roller safety guard switch (b26) for continuity.

Replace faulty safety switches (paragraphs 2-16, 2-74).

SECTION V. Maintenance Procedures

2-11. General. This section contains maintenance procedures which are the responsibility of the organizational maintenance personnel as authorized by the MAC in appendix B. The following topics will be included as applicable: a. Inspect, b. Service, c. Adjust, d. Remove, e. Repair, f. Install. For repair procedures which include disassembly, inspect all components of the assembly and replace any items which are badly worn or damaged. For specific maintenance of the TSS Press Section and semitrailer, refer to TM 5-3610-287-14 and TM 5-2330-305-14.

a. Maintenance Personnel. Unless otherwise specified in the setup, all maintenance procedures in this section are performed by a Printing and Binding Repairman MOS 83F20J6. When a second person is needed to aid in removal of a heavy component, that person will be a crew member: Printing and Binding Specialist MOS 83F20. An Electrician MOS 35E20 must be designated if any electrical leads are to be disconnected.

2-11. General (cont).

b. *Initial Condition.* The printing press must be shut down to perform maintenance procedures unless otherwise stated in the setup. If press must be operated to perform maintenance, observe all safety precautions.

c. *Zero Set Condition.* The press must be set to zero position in the following types of maintenance procedures:

(1) Before removing main cylinder drive gears. Gears are stamped with numbers 1, 2, 3, or 4. Matching gear has the same number (1, 2, 3, or 4) which must be adjacent to the number stamped on the front gear at zero setting of press.

(2) Before removing any assemblies that affect timing of press operations, zero set the press.

(3) Before removing unmarked components such as cams, zero set the press and match/mark the position of the components to they can be replaced in the same position. Any method such as tape, ink, paint or a punch, may be used to mark zero set position.

d. *Part Numbers.* Printing press part numbers with an F or /K01 indicate assemblies. When ordered, these parts will come with all items necessary for repair or replacement. For electrical component part numbers ending with an *), include the exact part number from the electrical component. For motors, also list the kind of current and voltage.

2-12. Solution Container Tube Assembly.

This task covers: a. Remove b. Repair c. Install

INITAL SETUP

Tools	*Equipment Conditions*
1.0 x 6.0 x 0.5 mm flat-tip screwdriver 22 mm combination wrench	Solution container empty

a. *Remove.* (figure 2-4)

(1) Loosen mounting clamp screw (1) and remove tube extension (2) from mounting bracket (3).

(2) Loosen hose clamp (4) and remove tube assembly from solution container hose (5).

(3) Unscrew tube extension (2) from valve (6).

b. *Repair.* Replace leaking or binding valve (6).

c. *Install.*

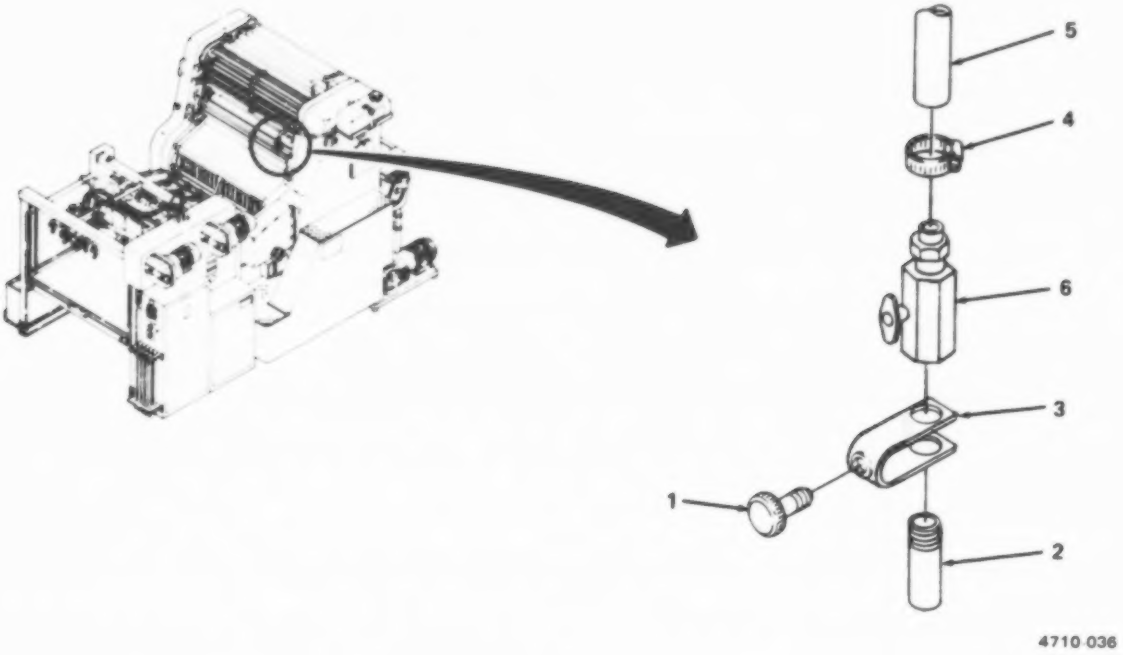
(1) Install tube extension (2) on valve (6).

(2) Install valve (6) into solution container hose (5) and tighten hose clamp (4).

(3) Install tube extension (2) into mounting bracket (3) and tighten mounting clamp screw (1).

NOTE

FOLLOW-ON MAINTENANCE:
Refill solution container.


5
4
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3
1
2
4710-036

Figure 2-4. Solution Container Tube Assembly Replacement.

2-13. Solution Container Assembly.

This task covers: a. Remove b. Repair c. Install

INITIAL SETUP

Tools	*Equipment Conditions*
1.0 x 6.0 x 0.5 mm flat-tip screwdriver 13 mm combination wrench	Solution container empty Tube assembly removed (para. 2-13)

a. *Remove.* (figure 2-5)

(1) Loosen hex-head screw (1) and hose clamp (2) and remove hose (3) from clamp (2).

(2) Loosen retaining strap (4) and remove container (5) from mounting shelf (6).

(3) Loosen hose clamp (7) and remove hose (3).

b. *Repair.*

(1) Replace cracked or leaking container (5).

(2) Replace cover (8) if cracked or if gasket is missing or worn.

(3) Replace cracked or leaking hose (3).

c. *Install.*

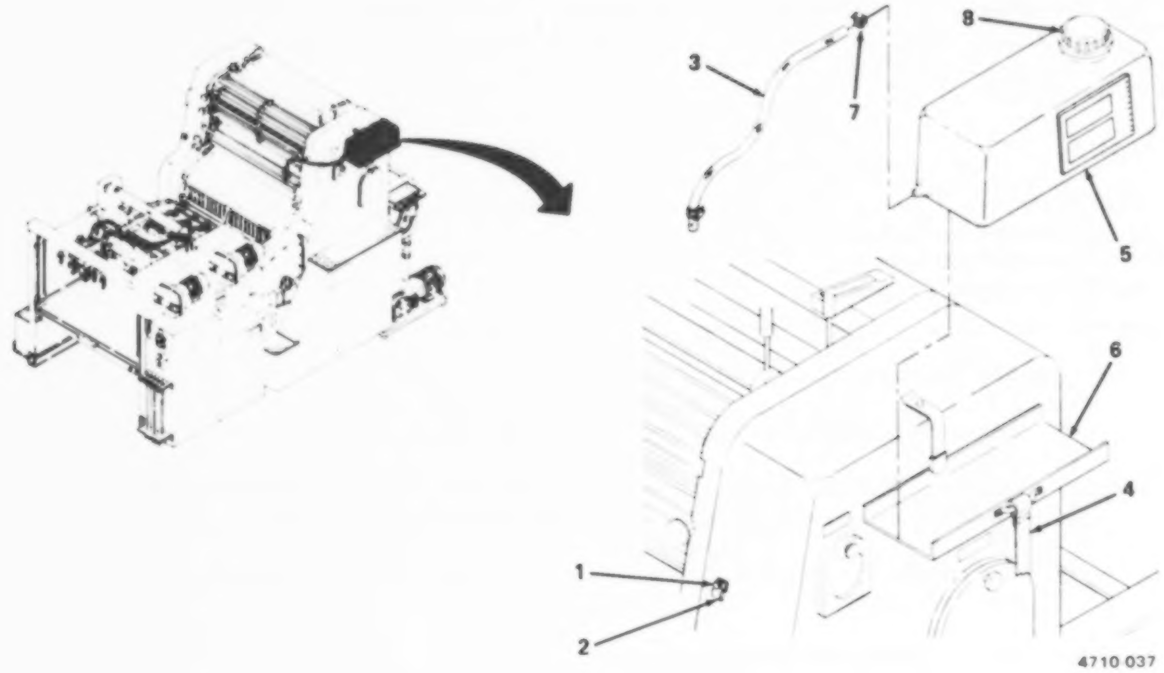
(1) Install hose (3) with hose clamp (7) on container (5). Tighten hose clamp (7).

(2) Install container (5) on mounting shelf (6) and secure with retaining strap (4).

(3) Install hose (3) in hose clamp (2) and tighten hex-head screw (1).

NOTE

FOLLOW-ON MAINTENANCE:
(1) Install tube assembly (para. 2-12).
(2) Refill solution container.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4710 037

Figure 2-5. Solution Container Replacement.

2-14. Solution Container Shelf Assembly.

This task covers: a. Remove b. Repair c. Install

INITIAL SETUP

Tools	*Equipment Conditions*
6 mm hex key 11 mm combination wrench 13 mm combination wrench No. 3 x 6 in. cross-tip screwdriver	Solution Container removed (para. 2-13)

a. Remove. (figure 2-6)

(1) Remove two hex-head screws (1), lockwashers (2), and washers (3).

(2) Remove socket-head bolt (4), inner container spacer (5), washer (6), lockwasher (7) and nut (8), and remove container shelf (9) from mounting bracket (10).

(3) Remove three countersunk cross-head screws (11) and remove mounting bracket (10) from main guard (12).

(4) Remove socket-head bolt (13) and retaining strap (14).

NOTE

Retaining loop (15) for strap and buckle (16) is riveted to container shelf.

b. *Repair.*

(1) Replace torn or frayed retaining strap (14).

(2) Hammer out bent container shelf (9).

(3) Replace missing container spacers (5).

(4) Replace stripped rivnuts (17).

NOTE

Outer container spacer is higher than inner spacer to tilt solution container for complete emptying.

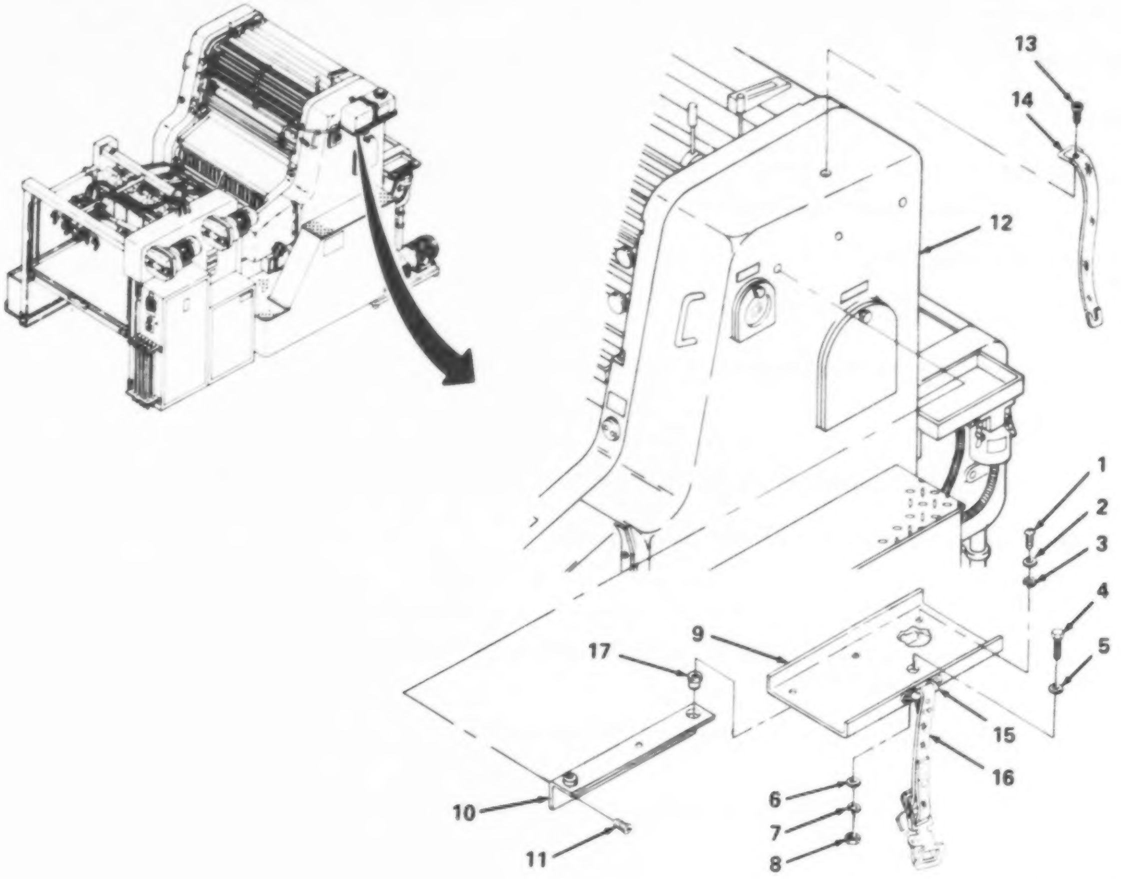
c. *Install.*

(1) Install retaining strap (14) and socket-head bolt (13).

(2) Install mounting bracket (10) on main guard (12) and install three cross-head screws (11).

(3) Install container shelf (9) on mounting bracket (10) and install socket-head bolt (4), inner container spacer (5), washer (6), lockwasher (7), and nut (8).

(4) Install two hex-head screws (1), lockwashers (2), and washers (3).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4710-038

Figure 2-6. Solution Container Shelf Replacement.

NOTE

FOLLOW-ON MAINTENANCE:
Install solution container (para. 2-13).

2-15. Ink Fountain Guard Assembly.

This task covers: a. Remove b. Repair c. Install

INITIAL SETUP

Tools

6 mm hex key

a. *Remove.* (figure 2-7)

(1) Loosen thumbscrew (1).

(2) Remove socket-head screw (2) and ink fountain guard (3) from stud (4).

b. *Repair.*

(1) Remove socket-head screw (5), separate collar (6) and inspect collar for wear.

(2) Replace collar (6) and socket-head screw (5).

c. *Install.*

(1) Holding ink fountain guard (3) in closed position, slide cam end over stud (4) and install socket-head screw (2).

(2) Tighten thumbscrew (1) (if press is to be transported).

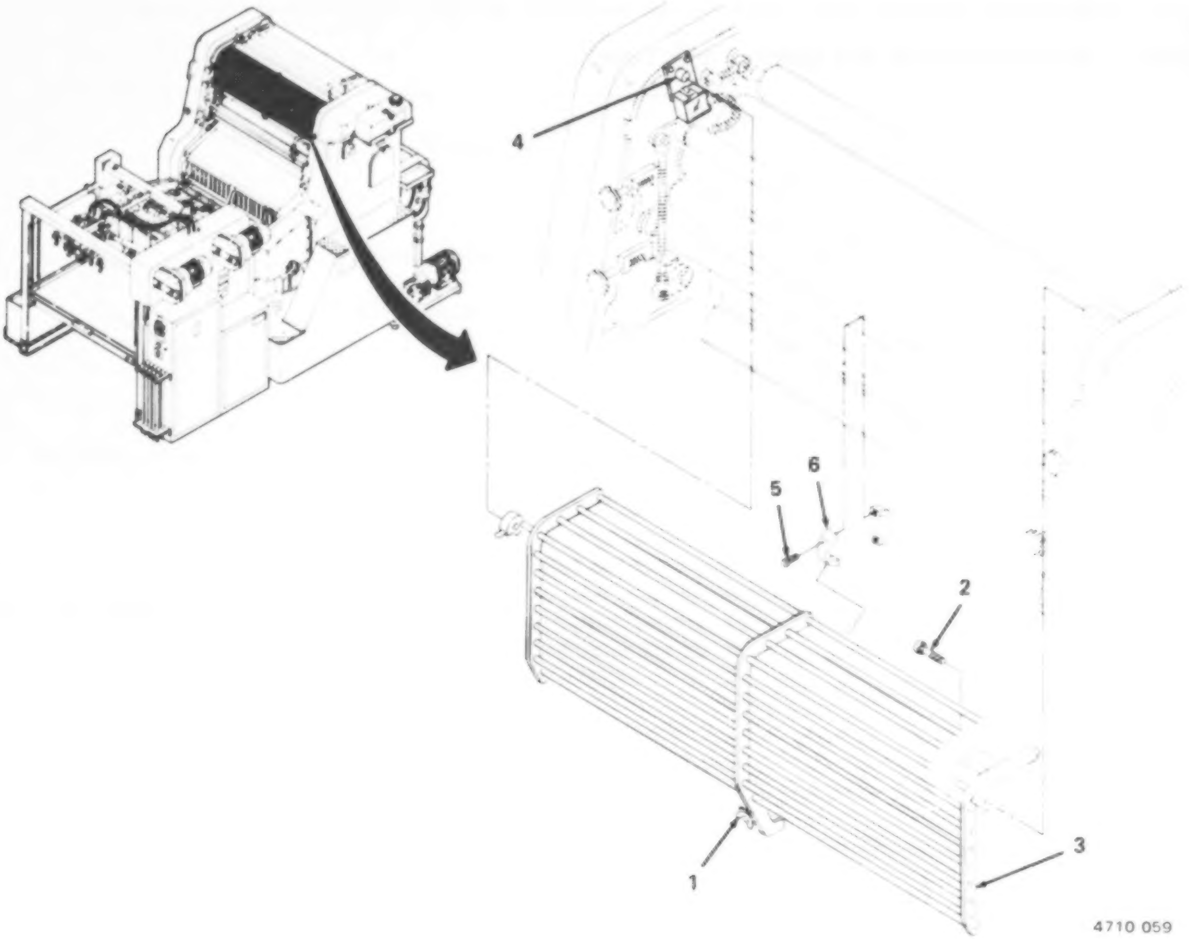
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Figure 2-7. Ink Fountain Guard Assembly Replacement.

2-16. Ink Fountain Guard Safety Limit Switch.

This task covers: a. Test b. Remove c. Install d. Aline

INITIAL SETUP

Tools

1 mm feeler gage
0.050 x 0.375 x 8 in. flat-tip screwdriver
No. 2 x 4 in. cross-tip screwdriver
22 mm open-end wrench
Multimeter

Personnel Required:

Electrician (MOS 35E20)

NOTE

This paragraph covers maintenance of the safety limit switch operated by the inking fountain guard. There are other similar safety limit switches on the printing press (table 2-2). These procedures are generally applicable to all safety limit switches. All switches are wired in the same but their mountings may vary.

a. *Test*. (figure 2-8)

(1) Loosen two screws (1) and open hinged cover (2).

(2) Loosen two cross-head screws (3) and tag and remove wires (4).

(3) Set multimeter to RX1 scale.

(4) Place one test lead on each screw terminal (3) from which lead was removed.

NOTE

Not all safety limit switches are normally closed. Continuity/no continuity may be reversed depending on how switch contacts are wired (either normally open, NO, or normally closed, NC).

(5) Depress plunger (5), meter should deflect full scale (open circuit). If not, replace switch (para b.)

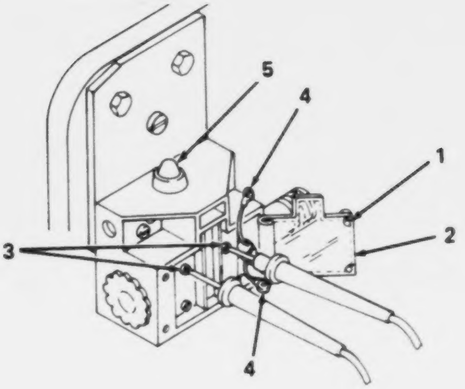

Figure 2-8. Safety Limit Switch Test.

b. Remove. (figure 2-9)

NOTE

Leads already removed in para a., Test above.

(1) Twist cable collar (1) clockwise and remove cable (2) from switch (3).

(2) Remove two slotted screws (3) and limit switch (4).

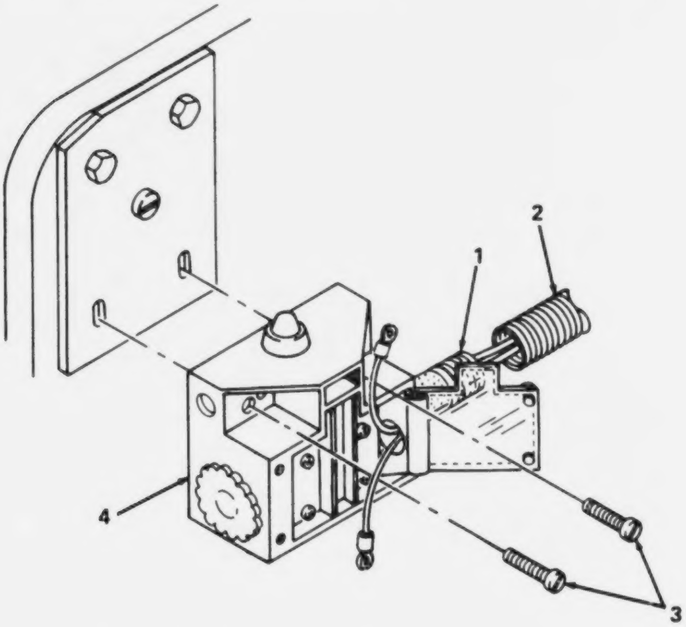

Figure 2-9. Safety Limit Switch Removal.

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2-16. Ink Fountain Guard Safety Limit Switch (cont).

c. *Install.* (figure 2-10)

(1) Install limit switch (1) and two slotted screws (2).

(2) Install cable (3) into limit switch (1) and twist on cable collar (4).

(3) Install leads (5) and tighten two cross-head terminal screws (6).

(4) Close the hinged cover (7). Tighten two screws (8).

(5) Aline limit switch (para. d).

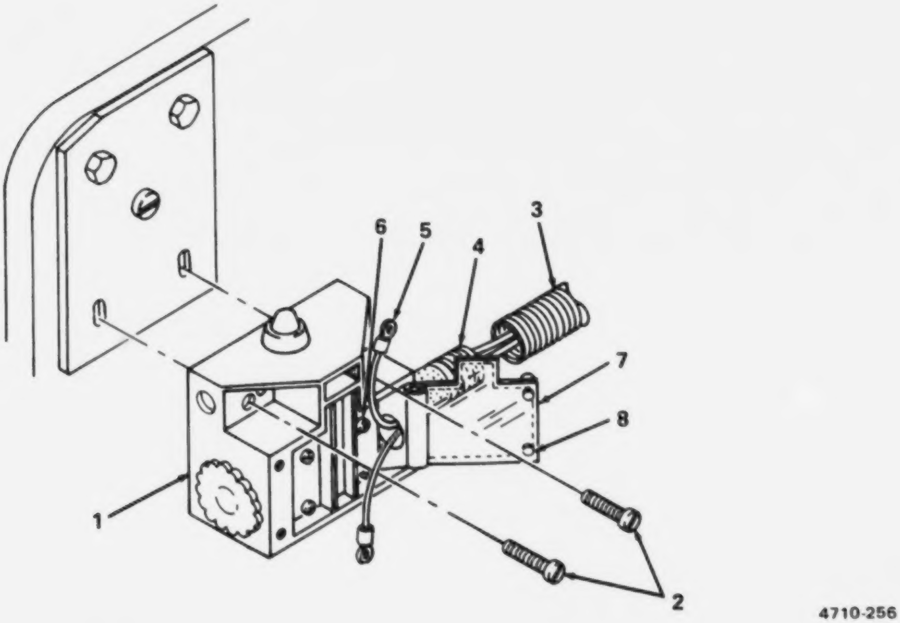


Figure 2-10. Safety Limit Switch Installation.

d. Aline. (figure 2-11)

NOTE

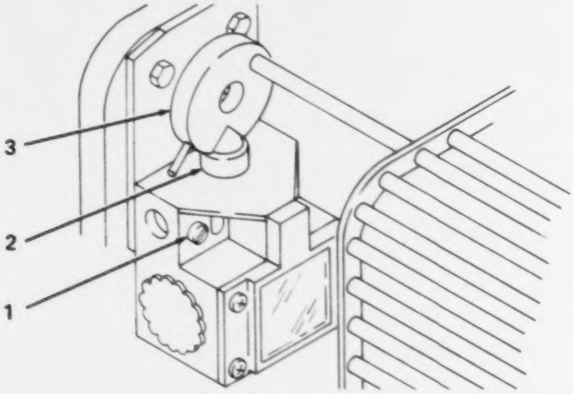
Safety limit switches on printing press open (or close) contacts after switch plunger is depressed (or not depressed). Safety limit switch plunger travels 1 mm between opening and closing of contacts regardless of the type of actuator or push rod that presses or releases the plunger. Mounting screws are the same for all switches.

(1) Loosen two screws (1).

(2) Using feeler gage, aline plunger to allow 1 mm space between plunger (2) and push rod (3).

(3) Tighten two screws (1).

(4) Recheck measurement with feeler gage.



4710-050

Figure 2-11. Safety Limit Switch Alinement.

2-17. Belt Guard.

This task covers: a. Remove b. Repair c. Install

INITAL SETUP

Tools	*Additonal Personnel Requirement*
10 mm combination wrench 13 mm combination wrench 6 mm hex key 1.0 x 1.6 x 0.5 mm flat-tip screwdriver	Printing and Binding Specialist, MOS 83F20

a. *Remove.* (figure 2-12)

(1) Remove transit screw (1) and lift foot step (2).

(2) Remove hex-head bolt (3) from inside belt guard (4).

(3) Remove socket-head bolt (5) and spacer (6).

(4) Remove socket-head bolt (7) from front of belt guard (4).

(5) Remove two hex-head bolts (8).

(6) Remove hex-head bolt (9).

(7) Using two persons, remove belt guard (4).

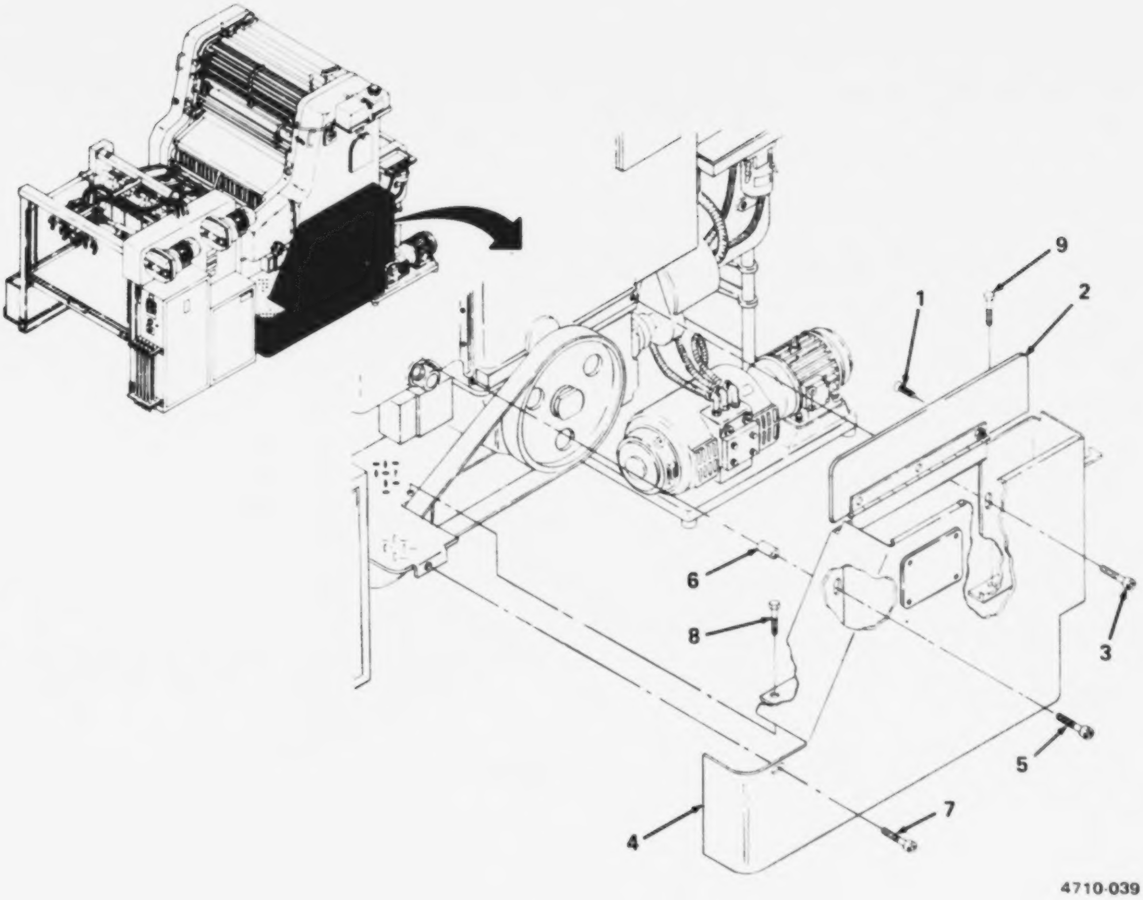

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Figure 2-12. Belt Guard Removal.

2-17. Belt Guard (cont).

b. Repair. (figure 2-13).

(1) Remove three hex nuts (1).

(2) Remove and replace foot step (2).

(3) Replace three hex nuts (1).

(4) Hammer out dents in belt guard (3).

(5) Remove and replace stripped rivnut (4).

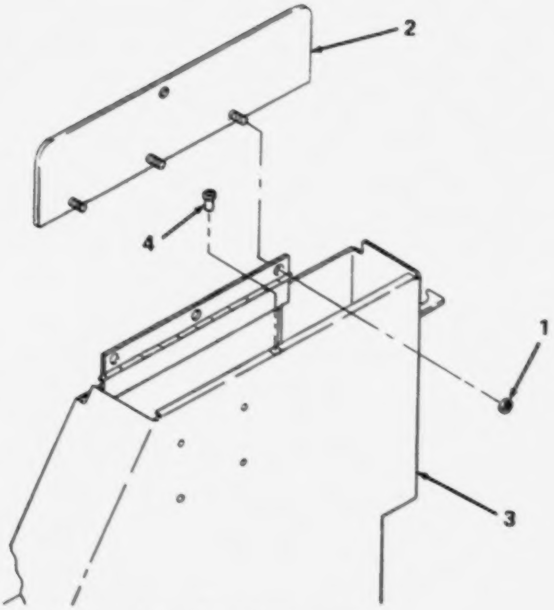


Figure 2-13. Belt Guard Repair.

c. Install. (figure 2-14)

(1) Using two persons, install belt guard (1).

(2) Install hex-head bolt (2).

(3) Install two hex-head bolts (3).

(4) Install socket-head bolt (4) in belt guard (1).

(5) Install spacer (5) and socket-head bolt (6).

(6) Install hex-head bolt (7) inside belt guard (1).

(7) Lower foot step (8) and install transit screw (9).

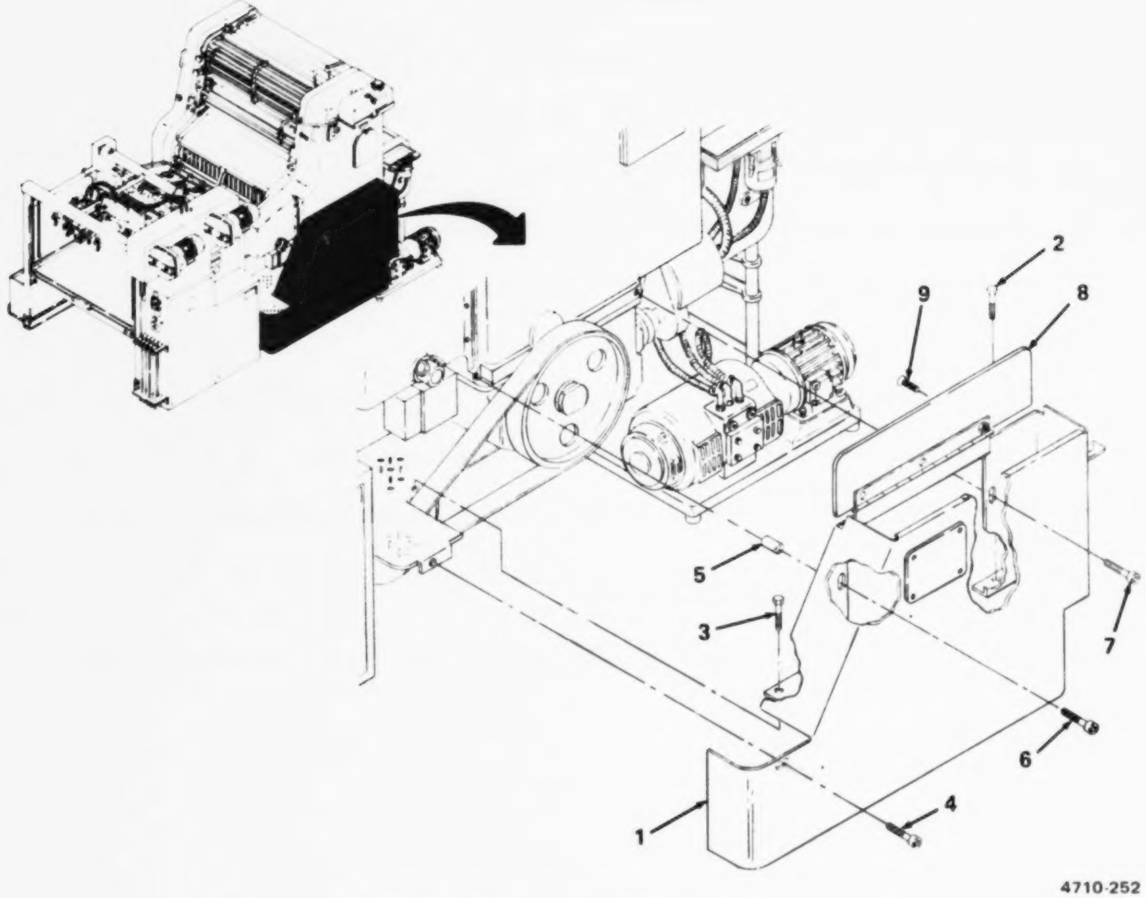


Figure 2-14. Belt Guard Installation.

2-18. Upper Guard and Accessories (O/S).

This task covers: a. Remove b. Repair c. Install

INITIAL SETUP

Tools	*Tools – cont.*
3 mm pin punch	17 mm combination wrench
4 mm pin punch	1.0 x 1.6 x 0.5 mm flat-tip screwdriver
5 mm hex key	Retaining-ring pliers
8 mm hex key	Ball-peen hammer

a. Remove. (figure 2-15)

(1) Remove four form roller journal lock screws (1).

(2) Remove retaining ring (2), spacer washer (3), handle (4), and spacer washer (5).

(3) Remove spring tension pin (6), handle (7), and stud and compression spring (8).

(4) Remove spring tension pin (9) and ink feed adjustment handwheel (10).

(5) Remove spring tension pin (11), handle (12), and stud and compression spring (13).

(6) Loosen hex nut (14) and remove handle (15).

(7) Remove spring tension pin (16) and remove handle (17).

(8) Remove retaining ring (18), spacer washer (19), handle (20), and spacer washer (21).

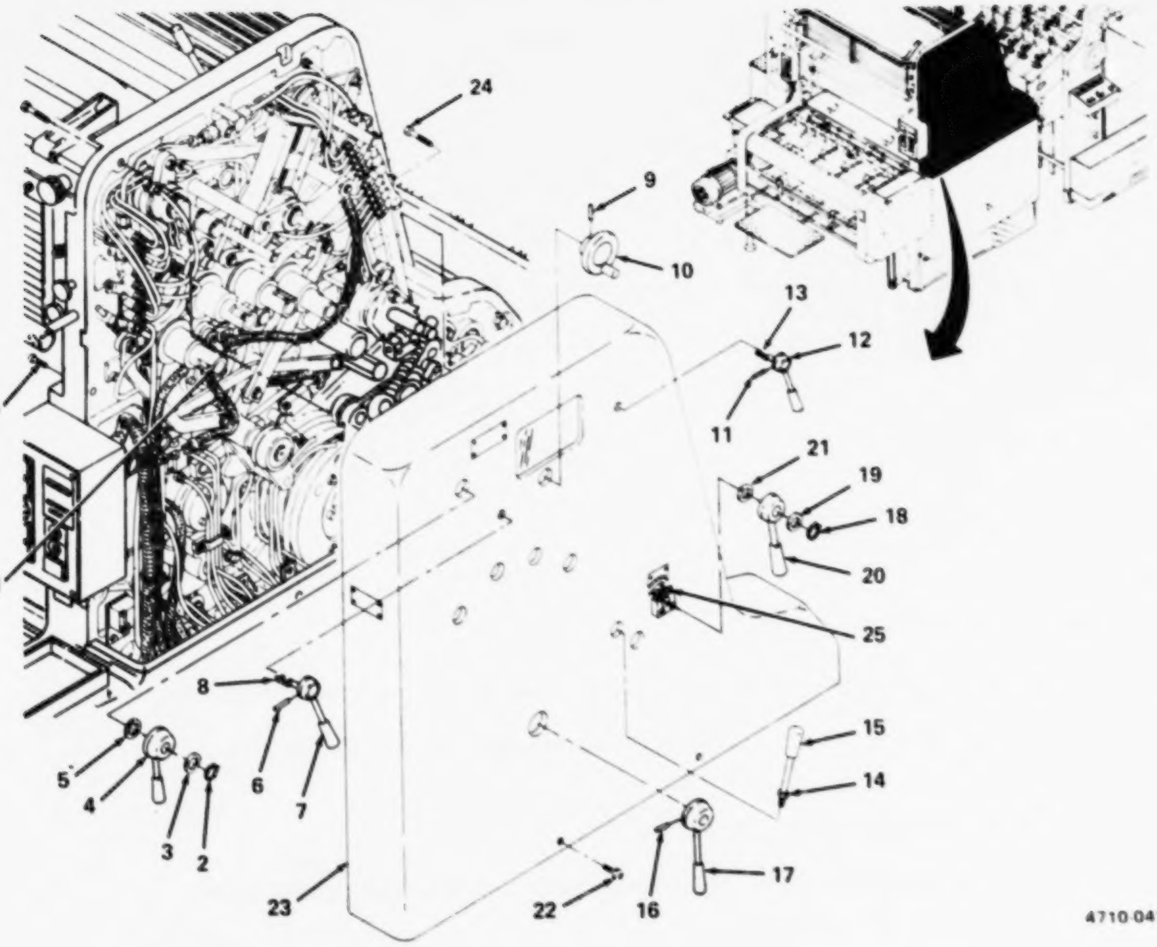
(9) Remove two socket-head screws (22) from front of upper guard (23).

(10) Remove three socket-head screws (24) from inside of O/S plate into feeder end of upper guard (23).

(11) Loosen brake slotted adjusting screw (25).

(12) Remove three socket-head screws (26) from inside of O/S side plate into delivery end of upper guard (23).

(13) Remove upper guard (23).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4710-041

Figure 2-15. Upper Guard Removal.

2-18. Upper Guard and Accessories (Operator Side) (cont).

b. Repair. (figure 2-16)

(1) Remove two hex nuts (1) and handle (2). Replace damaged handle.

(2) Remove two hex nuts (3) and plexiglass cover (4). Replace broken glass cover.

(3) Replace plexiglass cover (4) and two hex nuts (3).

(4) Replace handle (2) and two hex nuts (1).

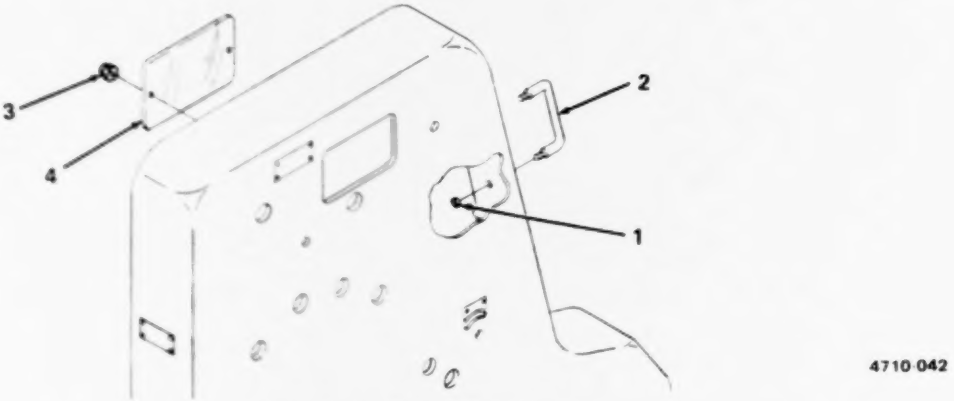


Figure 2-16. Upper Guard Repair.

c. Install. (figure 2-17)

(1) Apply light machine oil to mating surface of upper guard (1) and replace guard on press.

(2) Install three socket-head screws (2) through O/S side plate into delivery end of upper guard (1).

(3) Tighten slotted brake adjusting screw (3).

(4) Install three socket-head screws (4) through O/S plate into feeder end of upper guard (1).

(5) Install two socket-head screws (5) through front of upper guard (1).

(6) Install spacer washer (6), handle (7), spacer washer (8), and retaining ring (9).

(7) Install handle (10) and drive in spring tension pin (11).

(8) Install handle (12) and tighten hex nut (13).

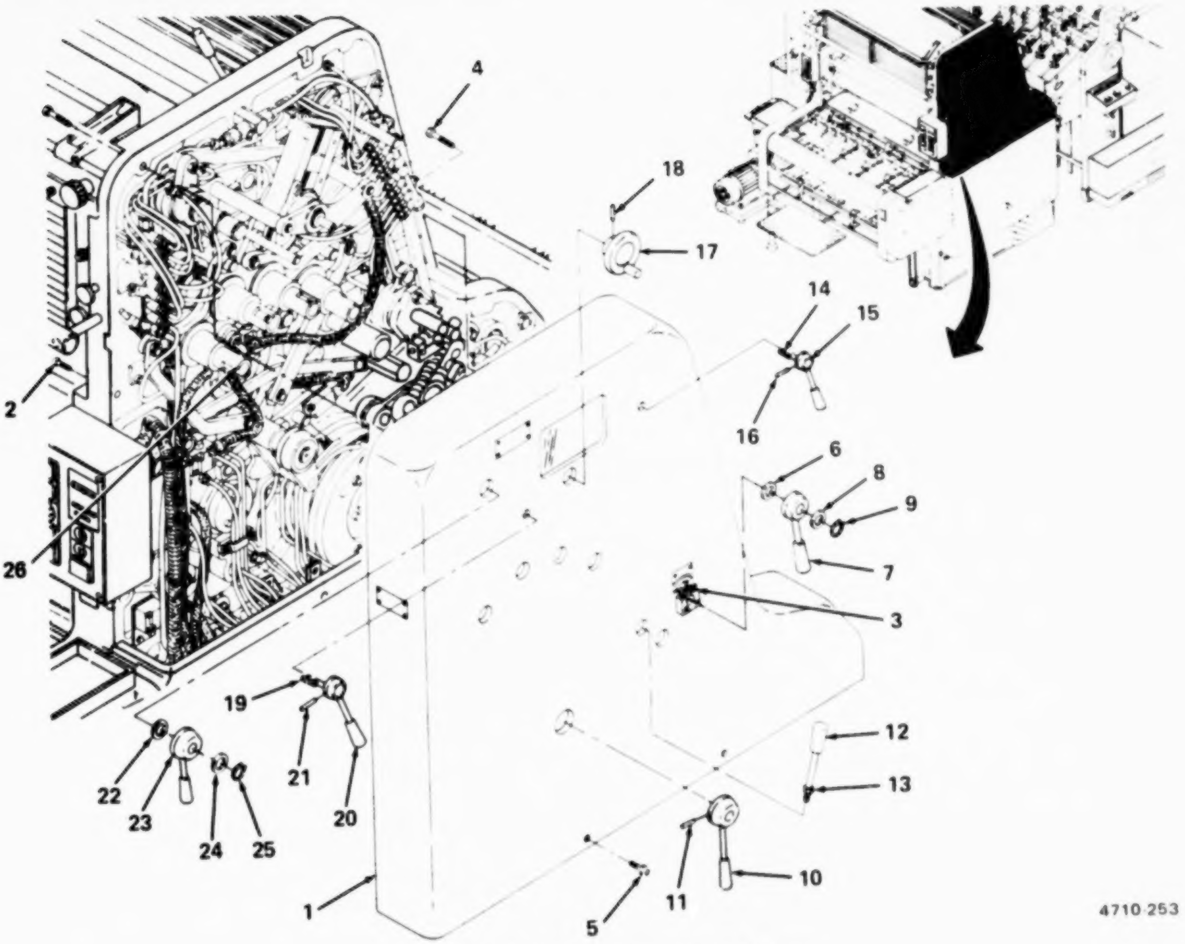
(9) Install stud and compression spring (14), handle (15), and drive in spring tension pin (16).

(10) Install ink feed adjustment handwheel (17) and drive in spring tension pin (18).

(11) Install stud and compression spring (19), handle (20), and drive in spring tension pin (21).

(12) Install spacer washer (22), handle (23), spacer washer (24), and retaining ring (25).

(13) Install four form roller journal lock screws (26).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4710-253

Figure 2-17. Upper Guard Installation.

2-19. Lower Guard and Accessories (O/S).

This task covers: a. Remove b. Repair c. Install

INITIAL SETUP

Tools

4 mm hex key
6 mm hex key
8 mm hex key
1.0 x 1.6 x 0.5 mm flat-tip screwdriver

a. Remove. (figure 2-18)

(1) Remove thumbscrew (1), socket-head screw (2), and suction roller movement knob (3).

(2) Remove socket-head screw (4) in center of guard.

(3) Remove two socket-head screws (5) at bottom of guard.

(4) Remove four socket-head screws (6) from inside of O/S frame (7) (two on feeder end and two on delivery end).

(5) Remove lower guard (8).

(6) Remove two slotted screws (9) and tool tray (10).

(7) Remove thumbscrew (11) and lower guard locking tab (12).

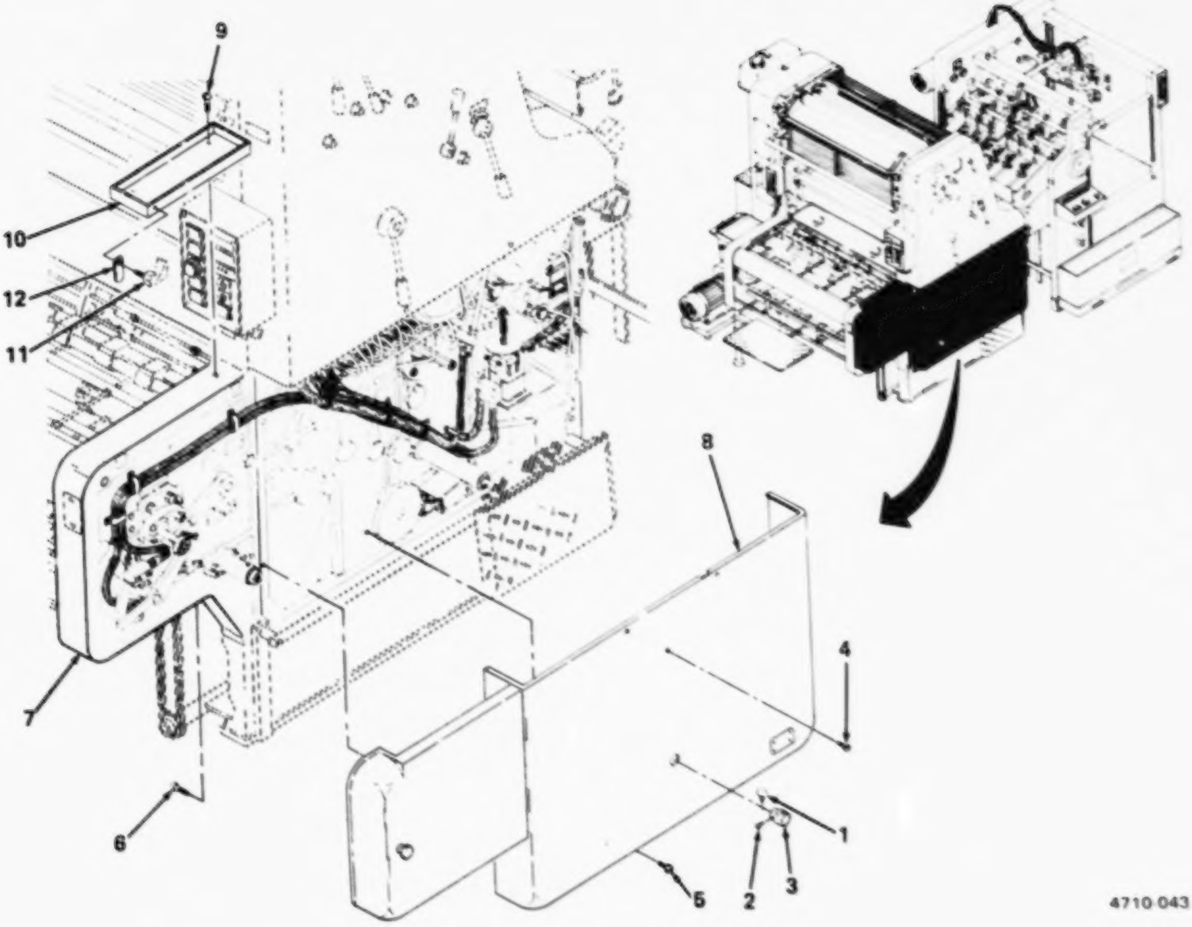
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Figure 2-18. Lower Guard Removal.

2-19. Lower Guard and Accessories (cont).

b. Repair. (figure 2-19)

(1) Remove 12 slotted screws (1), hinges (2) and door (3).

(2) Replace door (3), hinges (2) and 12 slotted screws (1).

(3) Replace damaged lower guard locking tab (4).

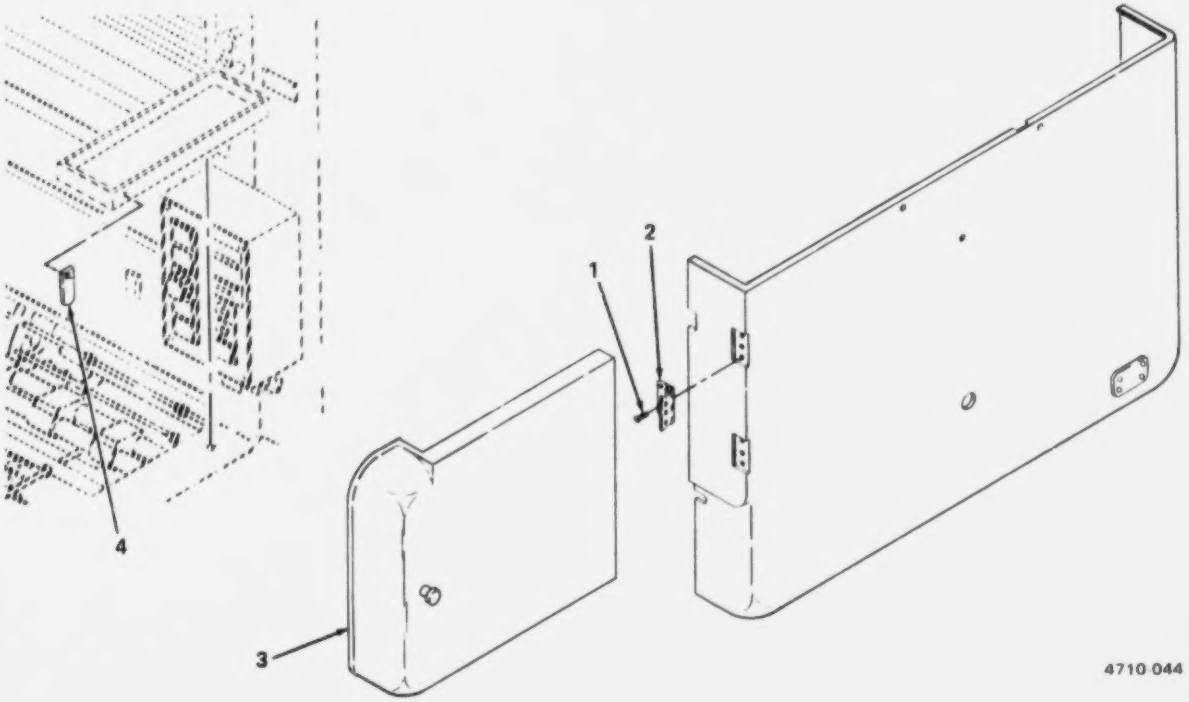

Figure 2-19. Lower Guard Repair.

c. Install. (figure 2-20)

(1) Install lower guard locking tab (1) and thumbscrew (2).

(2) Install tool tray (3) and two slotted screws (4).

(3) Install lower guard (5) on press.

(4) Install four socket-head screws (6) through O/S frame (7) (two at feeder end and two at delivery end).

(5) Install two socket-head screws (8) in bottom of guard.

(6) Install socket-head screws (9) in center of guard.

(7) Install suction roller movement knob (10), socket-head screw (11), and thumbscrew (12).

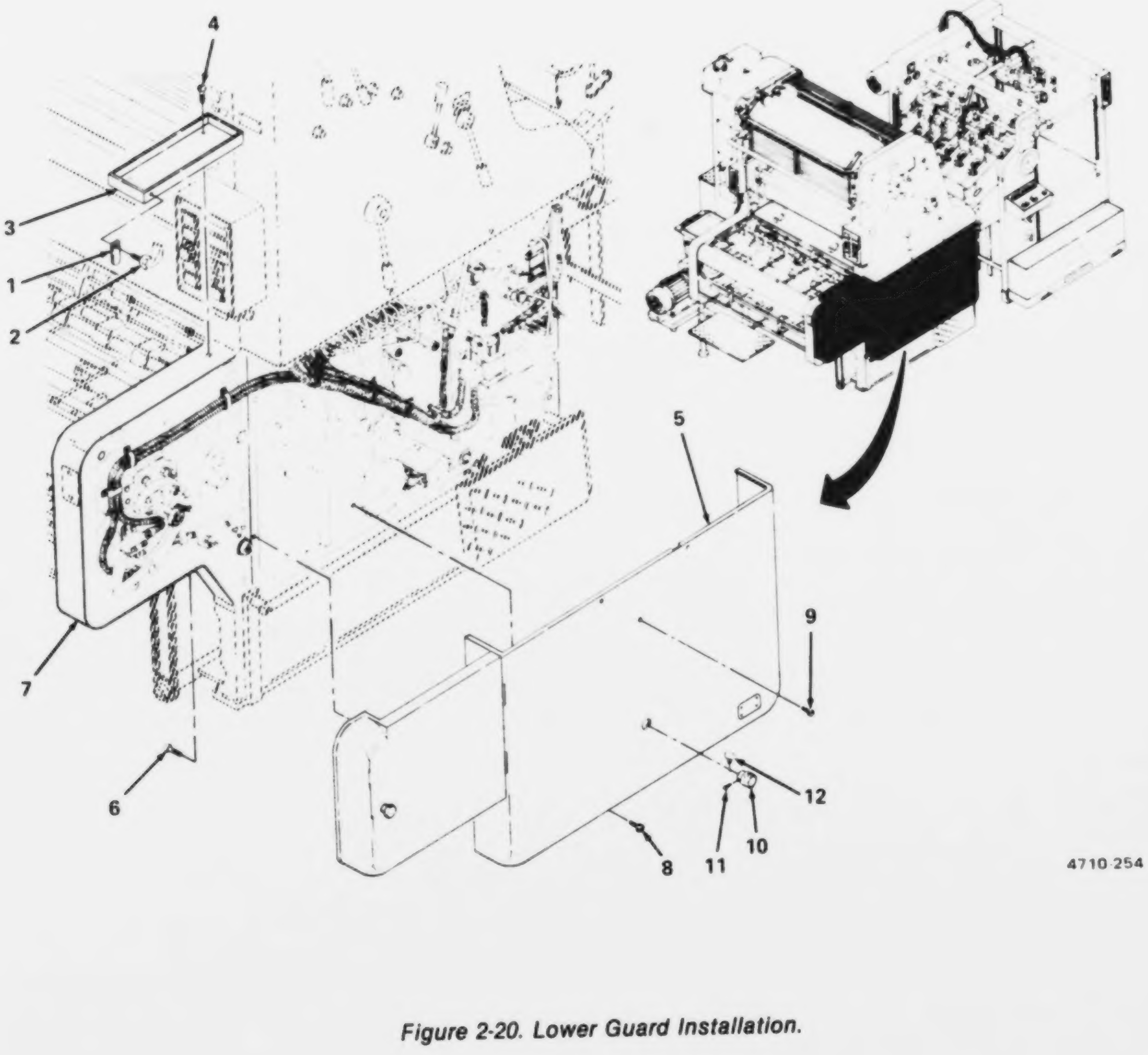
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Figure 2-20. Lower Guard Installation.

2-20. Main Guard Assembly.

This task covers: a.Remove b. Install

INITIAL SETUP

Tools	*Equipment Conditions*
6 mm hex key	Dampening olution container removed (para. 2-13)
8 mm hex key	Belt guard removed (para. 2-17)
10 mm combination wrench	Ink fountain guard removed (para. 2-15)
14 mm combination wrench	
17 mm combination wrench	
1.0 x 1.6 x 0.5 mm flat-tip screwdriver	

a. Remove. (figure 2-21)

(1) Loosen lock nut (1) and remove oil bypass valve knob (2).

(2) Remove lock nut (1), two screws (3), plate (4) and rubber gasket (5).

(3) Rmeove oil bypass valve (6).

(4) Remove three socket-head screws (7) in D/S frame at delivery end of guard.

(5) Remove four socket-head screws (8) in D/S frame under bottom of guard.

(6) Remove two hex-head screws (9) at bottom of guard.

(7) Remove four socket-head screws (10) at feeder end of guard.

(8) Remove one hex-head spacer (11).

(9) Remove socket-head screw (12) and spacer (13) in D/S frame at top of guard.

(10) Remove two socket-head screws (14) in D/S frame at feeder end of guard.

(11) Remove guard (15).

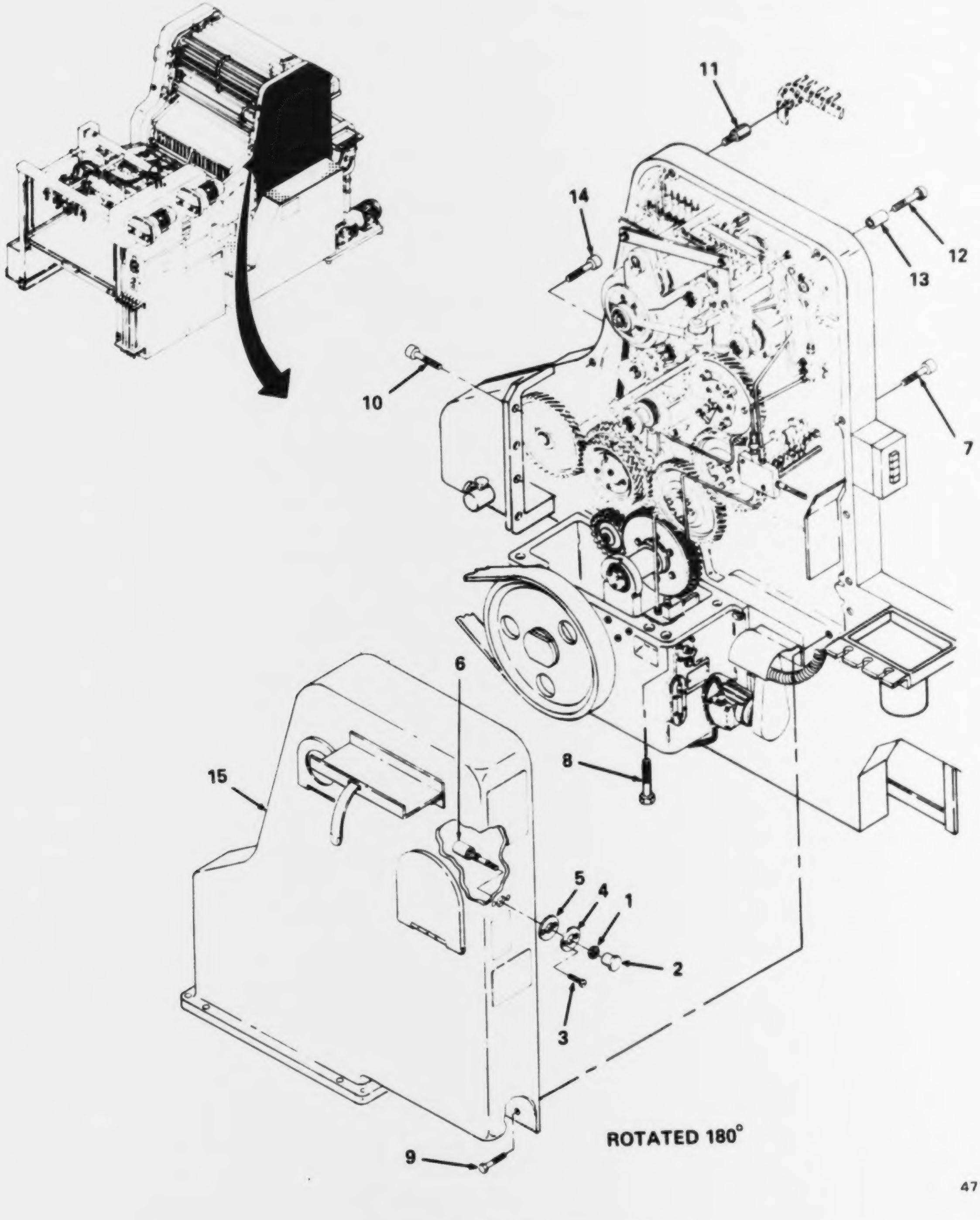
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Figure 2-21. Main Guard Removal.

2-20. Main Guard Assembly (cont).

b. *Install.* (figure 2-22)

(1) Install guard (1).

(2) Install two socket-head screws (2) in D/S frame at feeder end of guard.

(3) Install spacer (3) and socket-head screw (4) at top of guard.

(4) Install one hex-head spacer (5).

(5) Install four socket-head screws (6) at feeder end of guard.

(6) Install two hex-head screws (7) at bottom of guard.

(7) Install four socket-head screws (8) in D/S frame under bottom of guard.

(8) Install three socket-head screws (9) in D/S frame at delivery end of guard.

(9) Install oil bypass valve (10).

(10) Install rubber gasket (11), plate (12), two screws (13), and lock nut (14).

(11) Install oil bypass valve knob (15) and tighten lock nut (14).

NOTE

FOLLOW-ON MAINTENANCE:
(1) Install ink fountain guard (para. 2-15).
(2) Install belt guard (para. 2-17).
(3) Install dampening solution container (para. 2-13).

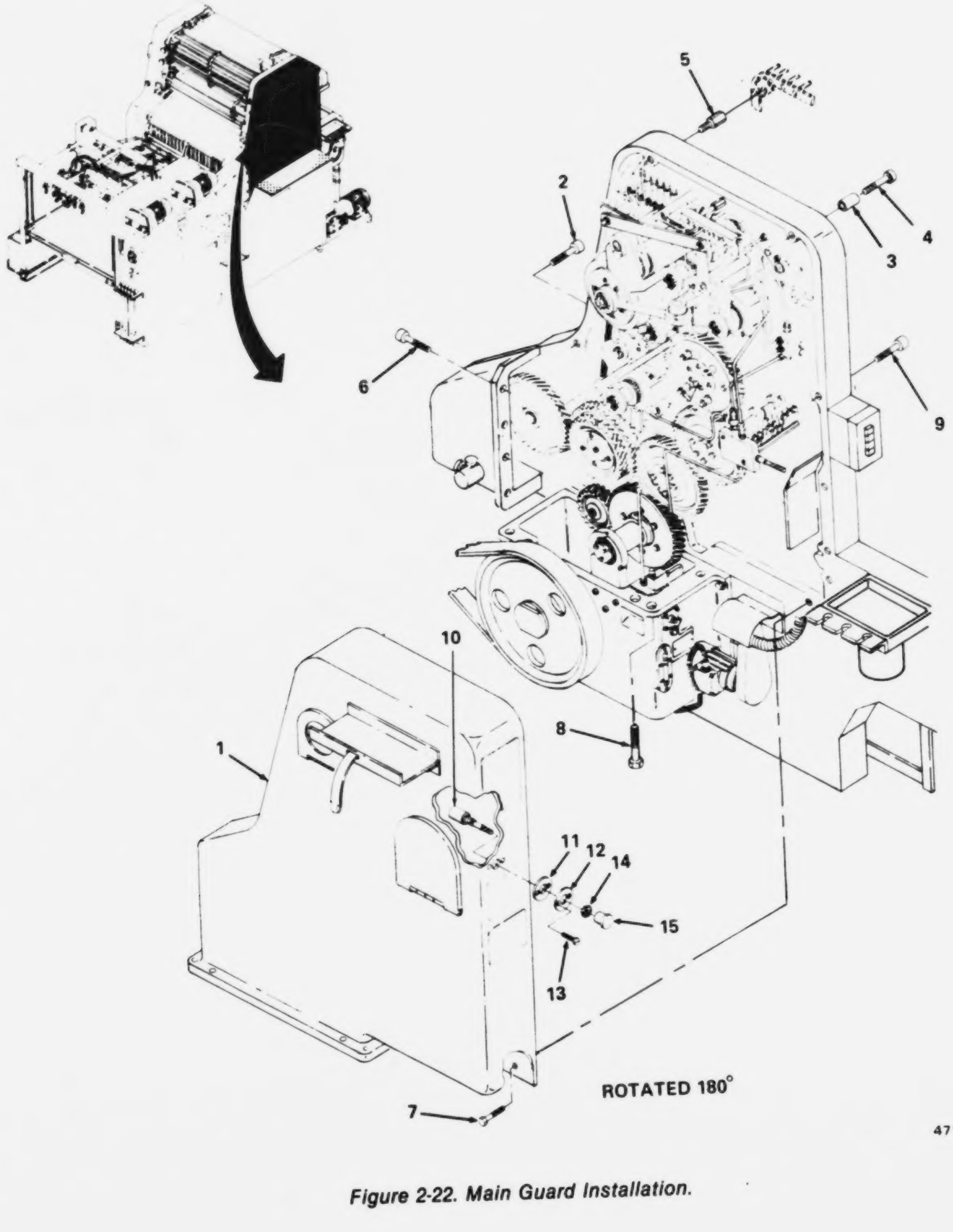
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Figure 2-22. Main Guard Installation.

2-21. Delivery Guard.

This task covers: a. Remove b. Repair c. Install

INITIAL SETUP

Tools

5 mm hex key
8 mm hex key
8 mm combination wrench
4 mm pin punch
Ball-peen hammer

Equipment Conditions

Lower guard door (O/S) open (para. 2-19)

a. *Remove.* (figure 2-23)

(1) Loosen four hex-head screws (1).

(2) Lift and remove delivery guard (2).

(3) Remove four hex-head screws (1).

(4) Remove D/S hinge (3).

(5) Remove four slotted screws (4).

(6) Remove two socket-head screws (5), washers (6), angle pieces (7), spacers (8), and plexiglass guard (9).

(7) Remove two socket-head screws (10), washers (11), and guard plate (12).

b. *Repair.* (figure 2-23)

(1) Replace damaged plexiglass guard (9).

(2) Replace damaged delivery guard (2).

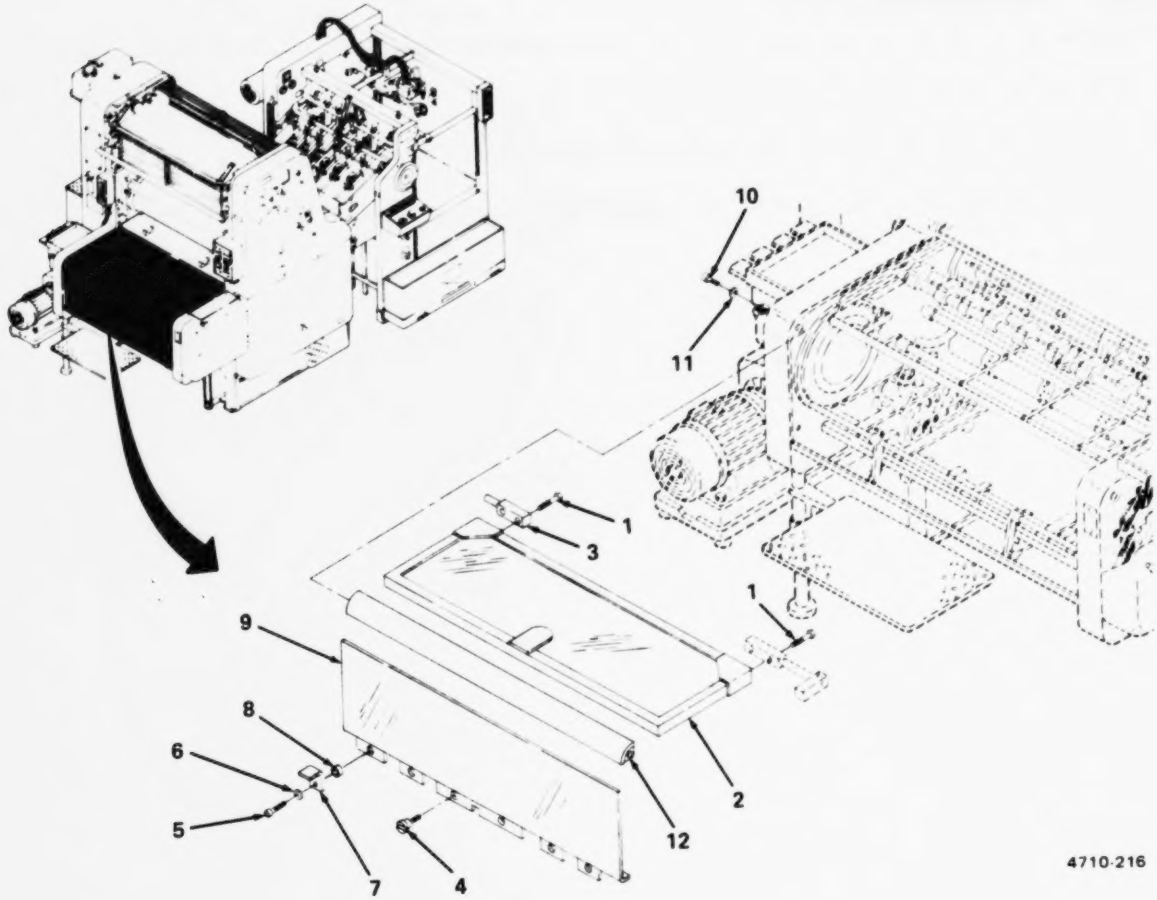
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Figure 2-23. Delivery Guard Removal.

2-21. Delivery Guard (cont).

c. *Install.* (figure 2-24)

(1) Install plate guard (1), two washers (2), and two socket-head screws (3).

(2) Install plexiglass guard (4), two spacers (5), angle pieces (6), washers (7), and two socket-head screws (8).

(3) Install four slotted screws (9).

(4) Install D/S hinge (10).

(5) Install four hex-head screws (11).

(6) Install delivery guard (12).

(7) Tighten four hex-head screws (11).

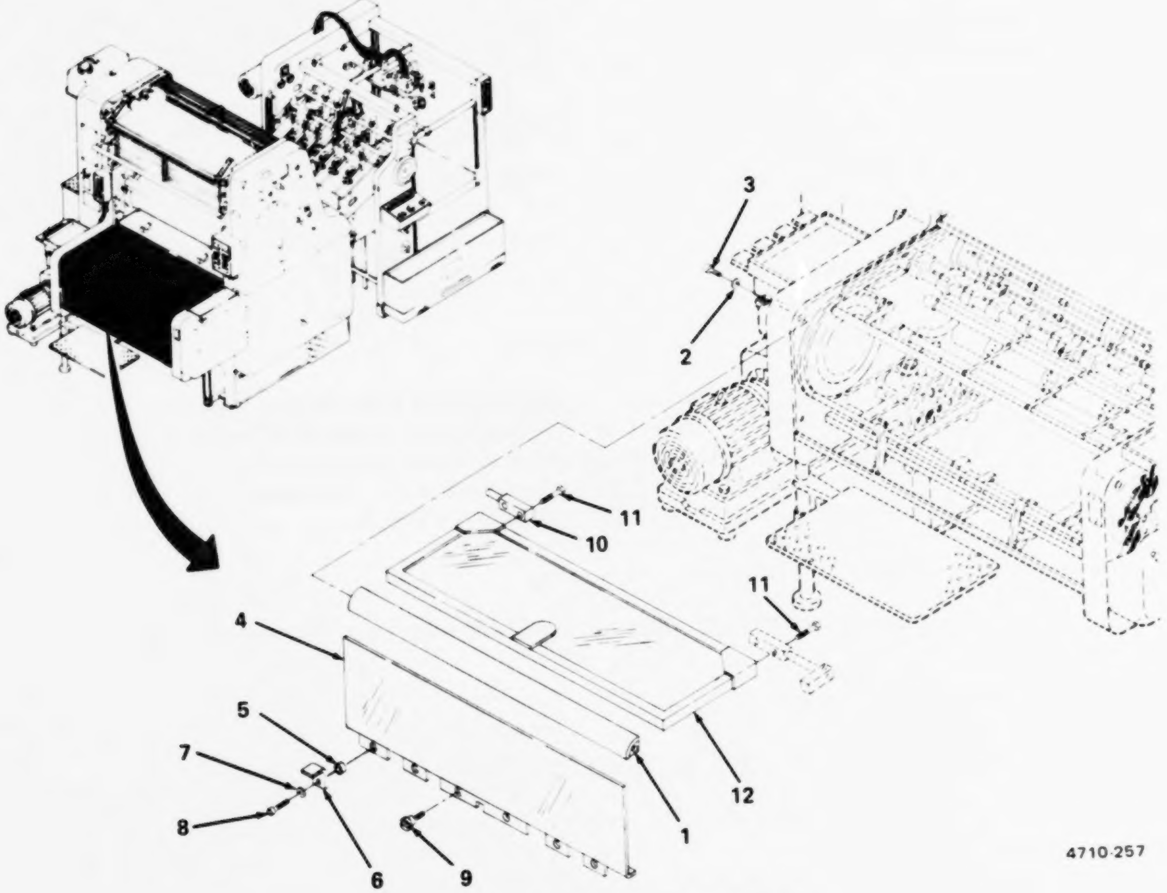
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Figure 2-24. Delivery Guard Installation.

NOTE

FOLLOW-ON MAINTENANCE:
Close lower guard door (O/S) (para. 2-19).

2-22. Manual Inking Roller Assembly.

This task covers: a. Remove b. Repair c. Install

INITIAL SETUP

Tools

10 mm combination wrench
17 mm combination wrench
5 mm pin punch
8 in. bronze punch
4 mm pin punch
0.050 x 0.375 x 8 in. flat-tip screwdriver
Ball-peen hammer

Equipment Condition

Main guard (D/S) removed (para. 2-20)
Upper guard (O/S) removed (para. 2-18)

Additional Personnel Requirement

Printing and Binding Specialist, MOS 83F20

a. *Remove.*

NOTE

Removal of assembly requires extensive disassembly of lubrication system components since assembly mounting bar is hollow and carries lubricating oil from D/S to O/S of press. If only the roller needs removal, do not remove main guard D/S or upper guard O/S and proceed to paragraph (1). To remove entire assembly, remove guards and proceed to paragraph (2).

(1) *Manual inking roller.* (figure 2-25)

(a) Using handle (1) or handle (2), rotate manual inking roller (3) so that roller is in up position.

(b) Remove two pins (4).

(c) Grasp roller and shift it towards D/S until O/S shaft end is free of lever (5).

(d) Rotate O/S lever (5) to roller down position.

(e) Pull out D/S roller shaft end from lever (6) and remove.

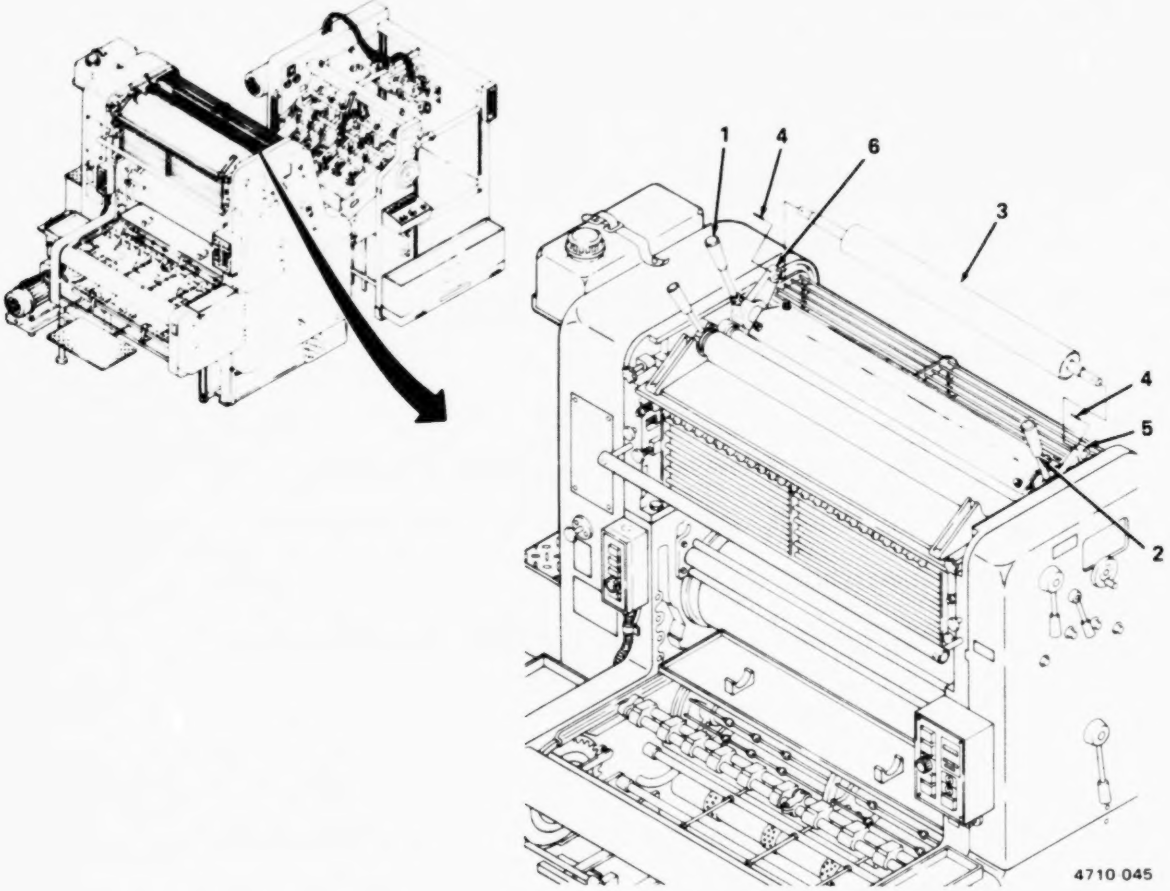

Figure 2-25. Manual Inking Roller Removal.

2-22. Manual Inking Roller Assembly (cont).

(2) *Manual inking roller assembly.* (figure 2-26)

(a) Tag and remove D/S tube fittings from manual inking roller lubrication distribution unit (1).

(b) Remove slotted mounting screw (2) from top of lubrication distribution unit (1) and remove unit from bracket (3).

(c) Remove hex bolt (4), washer (5), and mounting bracket (3).

(d) Tag and remove rigid and flexible tube fittings from lubrication "tee" (6).

(e) Remove hex-head extension (7), two seals (8), and lubrication "tee" (6).

(f) Loosen hex-head extension (9).

CAUTION

Do not remove hex-head extension (9) at this time.

(g) Loosen nut (10) and remove rigid lubrication line (11) from fitting (12).

(h) Remove fitting (12) and plug (13).

(i) Loosen nut (14) and remove flexible lubrication line (15) from fitting (16).

(j) Remove fitting (16).

NOTE

Inch ductor roller swing mechanism out of way to perform step (k).

(k) Loosen hex-head extension (17).

CAUTION

- Do not remove hex-head extension (17) at this time.
- Roller support levers (18) are loosen on mounting bar when manual inking roller assembly is removed.

(l) Using two persons, remove two hex-head extensions (9, 17) and lift manual inking roller assembly (19) out of press.

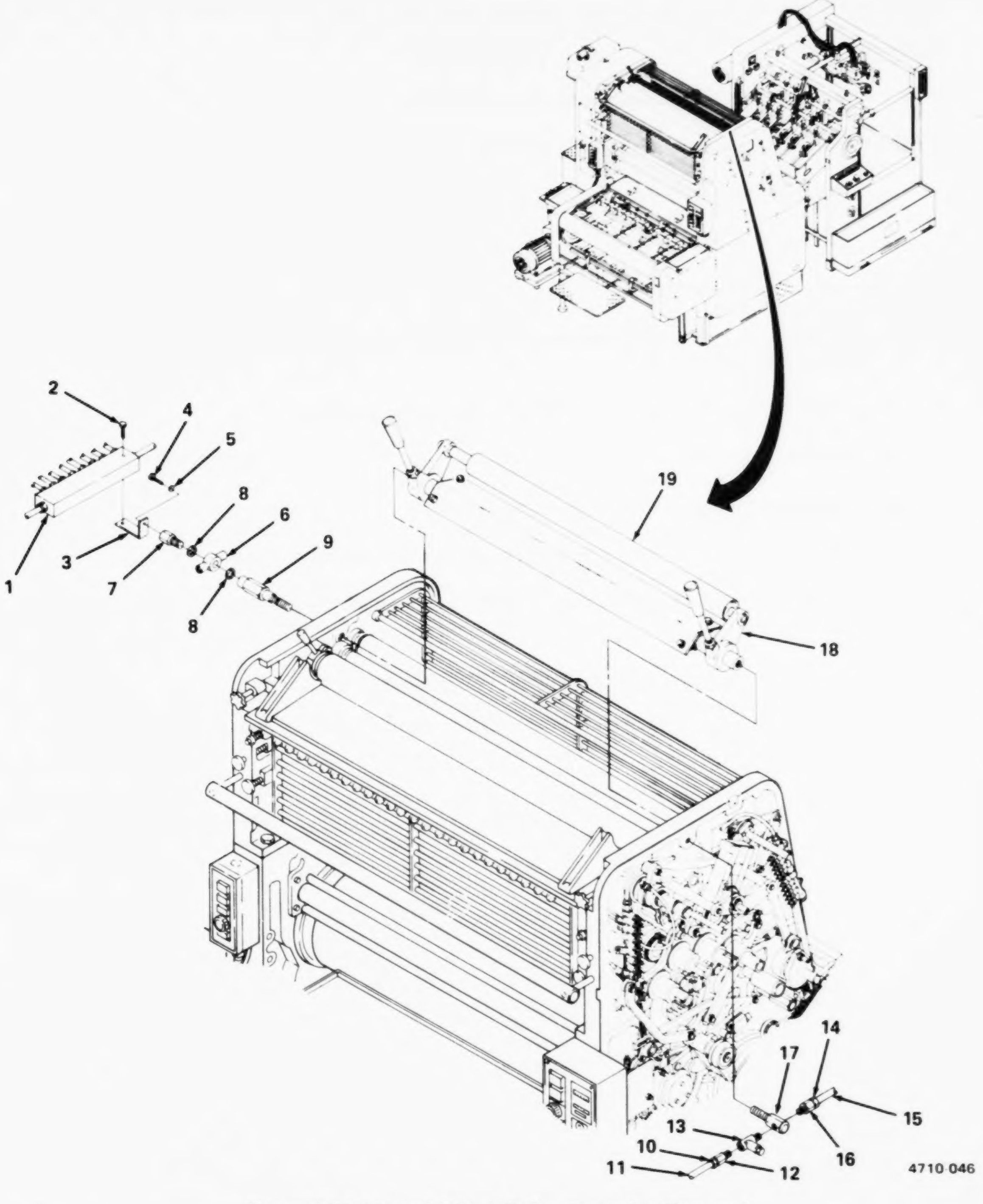
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Figure 2-26. Manual Inking Roller Assembly Removal.

2-22. Manual Inking Roller Assembly (cont).

b. Repair.

(1) *Manual inking roller.* Replace worn or gouged roller.

(2) *Manual inking roller assembly.* (figure 2-27)

(a) Remove pins (1) and inking roller (2).

(b) Slide roller support levers (3) off of mounting bar (4).

(c) Loosen hex nuts (5) and unscrew handles (6).

(d) Remove four socket-head screws (7), four hex nuts (8), eight washers (9), two clamps (10), and guard (11).

(e) Hammer out deformed guard. Replace worn or gouged roller.

(f) Replace guard (11) on mounting bar (4).

(g) Aline clamp (10) holes with holes in guard (11).

(h) Replace four socket-head screws (7), eight washers (9), and four hex nuts (8).

(i) Replace handles (6) and hex nuts (5) in roller support levers (3) and tighten hex nuts (5).

(j) Slide roller supports (3) onto mounting bar (4).

(k) Insert roller shaft at each end of roller (2) into support levers (3) and replace pins (1).

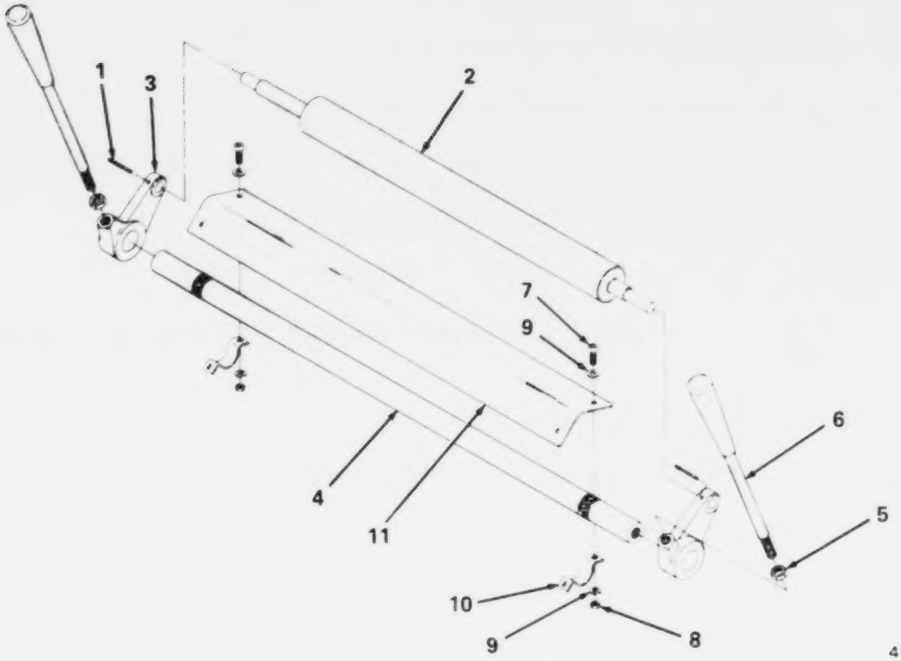
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Figure 2-27. Manual Inking Roller Assembly Repair.

2-22. Manual Inking Roller Assembly (cont).

c. Install.

(1) *Manual inking roller assembly.* (figure 2-28)

(a) Assure that support lever handles (1) are in roller down position.

(b) Using two persons, aline mounting bar (2) with holes in press side plates.

(c) Install hex-head extensions (3, 4) and tighten extensions.

NOTE

Hole in O/S hex-head extension (4) must be parallel to the ground when screw is tight.

(d) Install fitting (5) in extension (4).

(e) Install flexible lubrication line (6) and hex nut (7) in fitting (5).

(f) Install plug (8) and fitting (9).

(g) Install hex nut (10) and rigid lubrication line (11) in fitting (9).

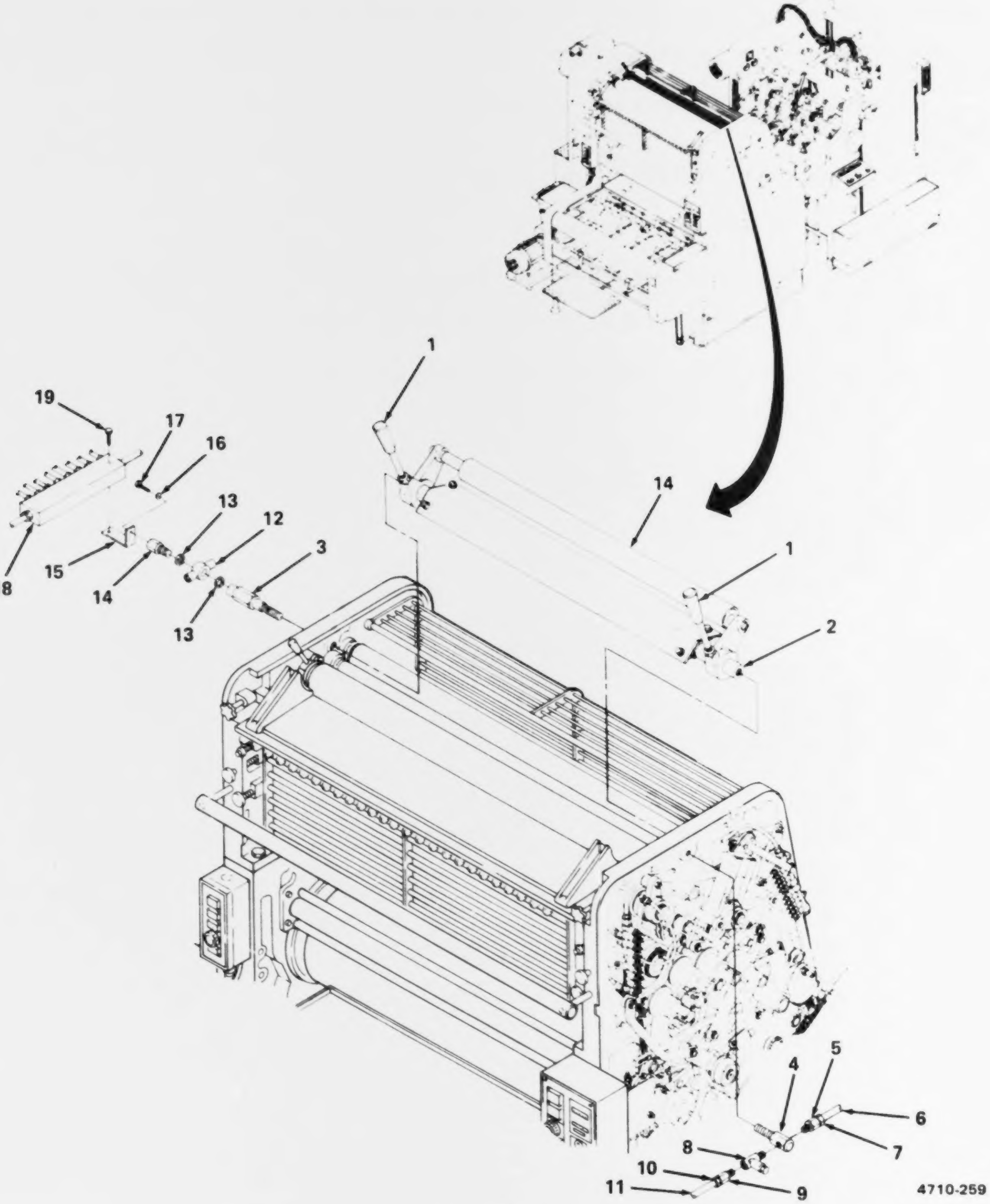
(h) Install D/S lubrication "tee" (12), two seals (13), and hex-head extension (14).

(i) Install rigid and flexible tube fittings in lubrication "tee" (12) and remove tags.

(j) Install mounting bracket (15), washer (16), and hex bolt (17).

(k) Mount lubrication distribution unit (18) on mounting bracket (15) and install and tighten slotted mounting screw (19).

(l) Install all lubrication fittings to lubrication distribution unit (18) and remove tags.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4710-259

Figure 2-28. Manual Inking Roller Assembly Installation.

2-22. Manual Inking Roller Assembly (cont).

(2) *Manual inking roller.* (figure 2-29)

(a) Assure that O/S lever (1) is in roller down position and D/S lever (2) is in roller up position.

(b) Install inking roller (3) shaft fully into hole in D/S lever (2).

(c) Rotate O/S lever (5) to roller up position.

(d) Slide inking roller O/S shaft into hole in O/S lever (1).

(e) Aline pin holes in roller shaft with holes in levers, and install pins (4).

(f) Rotate roller to down position using handle (5) or (6).

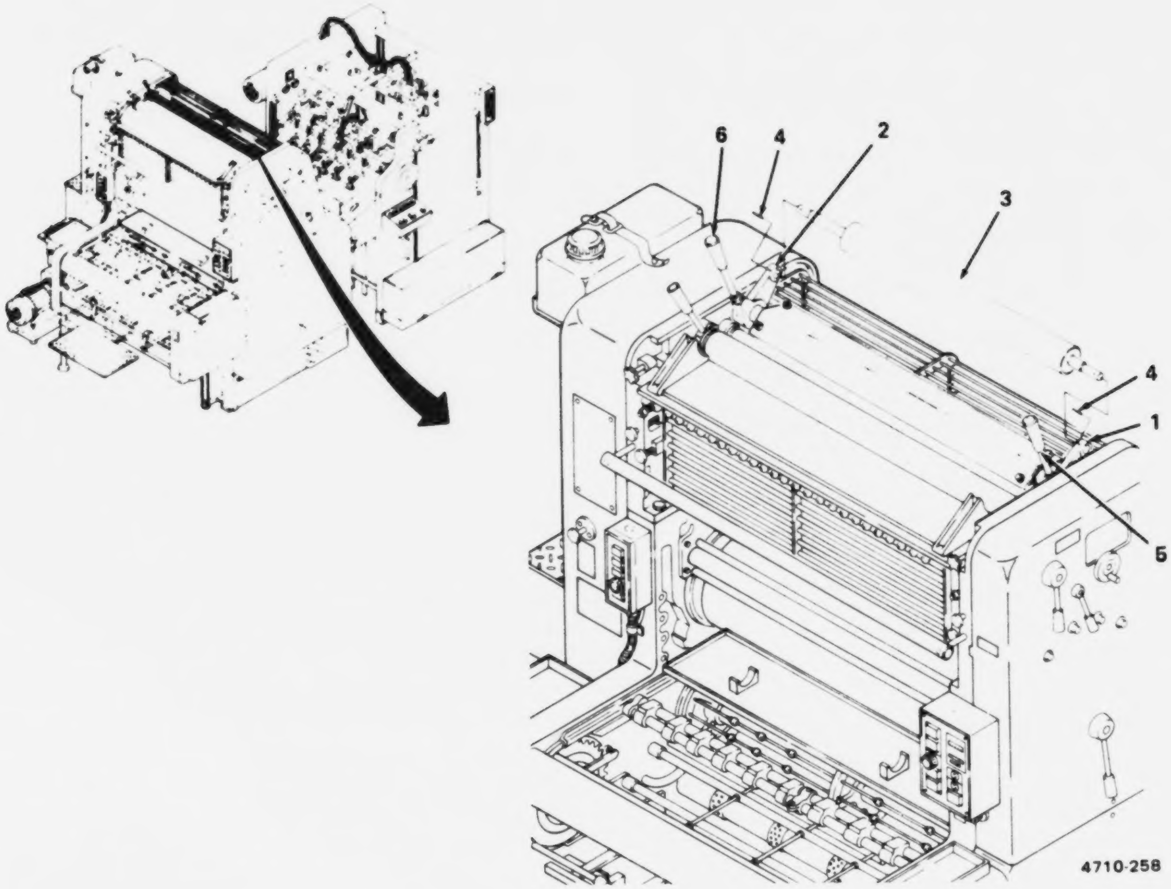


Figure 2-29. Manual Inking Roller Installation.

NOTE

FOLLOW-ON MAINTENANCE:
(1) Install upper guard (O/S) (para. 2-18).
(2) Install main guard (D/S) (para. 2-20).

2-23. Form Rollers Limit Switch.

This task covers:	a. Test	b. Remove	c. Install	d. Aline

INITIAL SETUP

Tools

1 mm feeler gage
Multimeter
0.050 x 0.375 x 8 in. flat-tip screwdriver
No. 2 x 4 in. cross-tip screwdriver
17 mm combination wrench

Equipment Conditions

Upper guard (O/S) removed (para. 2-18)

Additional Personnel Requirement

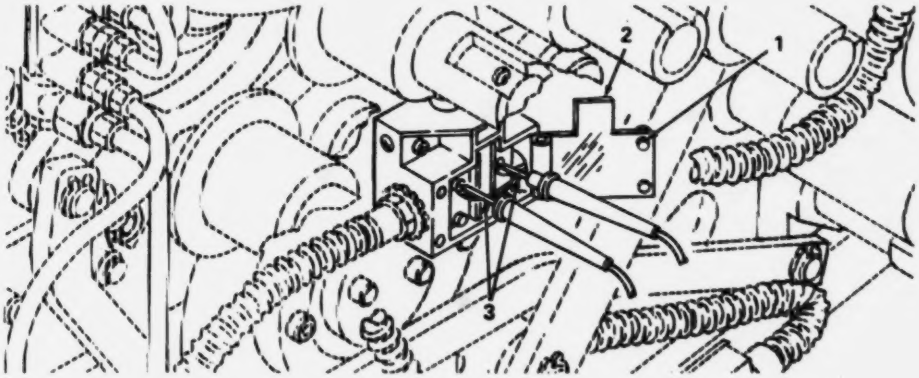
Electrician MOS 35E20

a. Test. (figure 2-30)

(1) Loosen two screws (1) and open hinged cover (2).

(2) Perform continuity test (refer to para. 2-16) holding test leads (3) against appropriate terminal screws.

(3) If no continuity (in either plunger position), replace switch.



4710-218

Figure 2-30. Form Rollers Limit Switch Test.

b. *Remove*. (figure 2-31)

NOTE

Wiring on the printing press is pretagged and matched to its connecting terminal. Retag wires before replacing.

(1) Loosen two screws (1) and open hinged cover (2).

(2) Loosen two retaining screws (3) and remove and tag leads (4).

(3) Twist cable collar (5) clockwise and remove cable (6) from limit switch (7).

(4) Remove two screws (8) and limit switch (7).

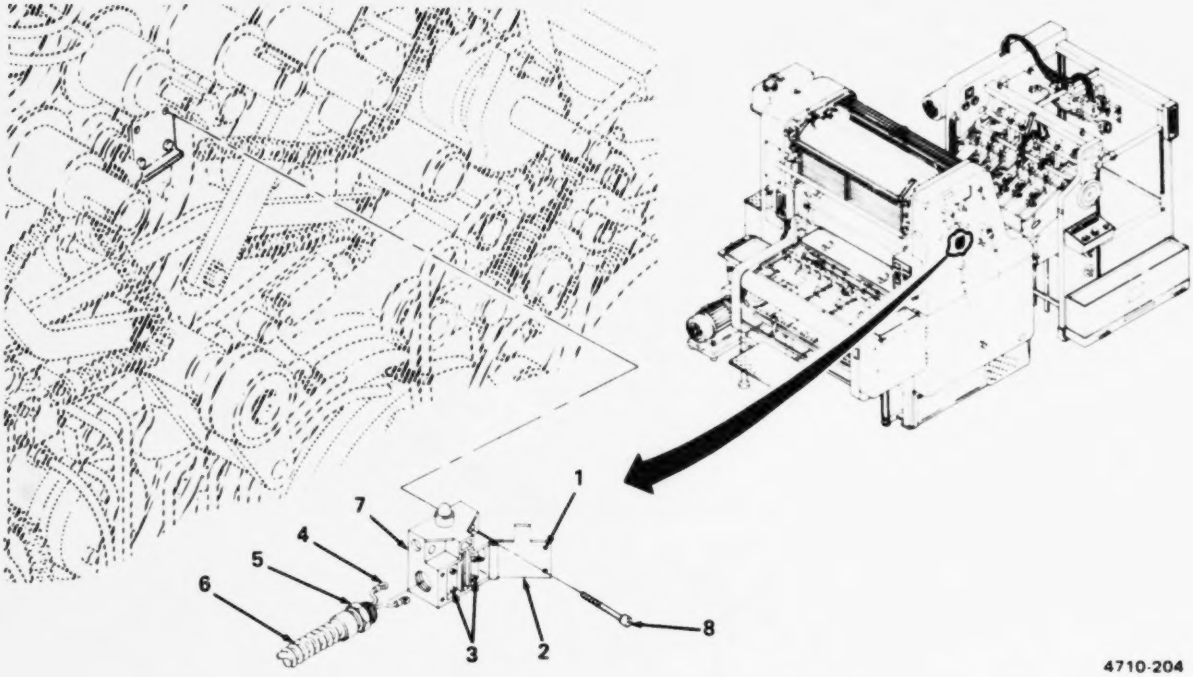


Figure 2-31. Form Rollers Limit Switch Removal.

2-23. Form Rollers Limit Switch (cont).

c. *Install.* (figure 2-32)

(1) Install limit switch (1) and two screws (2).

(2) Install cable (3) into limit switch (1) and twist cable collar (4) counterclockwise.

(3) Install leads (5) and tighten two retaining screws (6).

(4) Close the hinged cover (7). Tighten two screws (8).

(5) Aline limit switch (para. d).

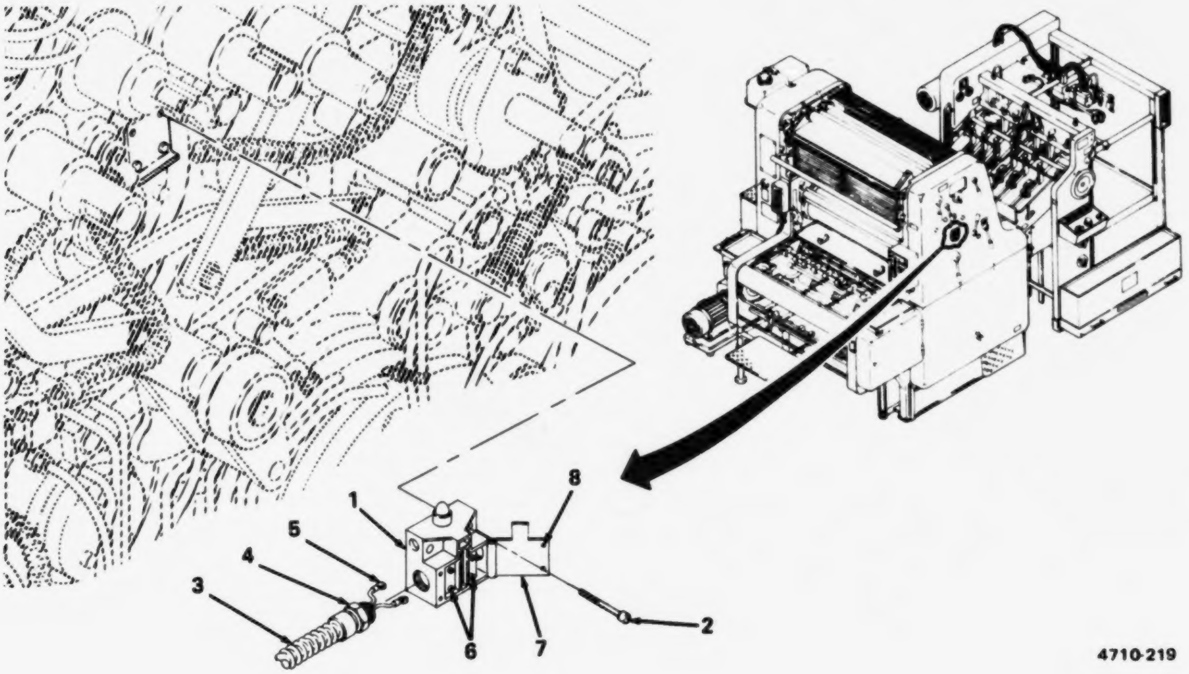


Figure 2-32. Form Rollers Limit Switch Installation.

d. ***Aline.*** (figure 2-23)

NOTE

Safety limit switch plunger travels 1 mm between opening and closing of contacts regardless of the type of actuator or push rod that presses or releases the plunger. Mounting screws are the same for all switches.

(1) Loosen two screws (1).

(2) Using feeler gage, aline plunger to allow 1 mm space between plunger (2) and form rollers stopping piece levers (3).

(3) Tighten two screws (1).

(4) Recheck measurement with feeler gage.

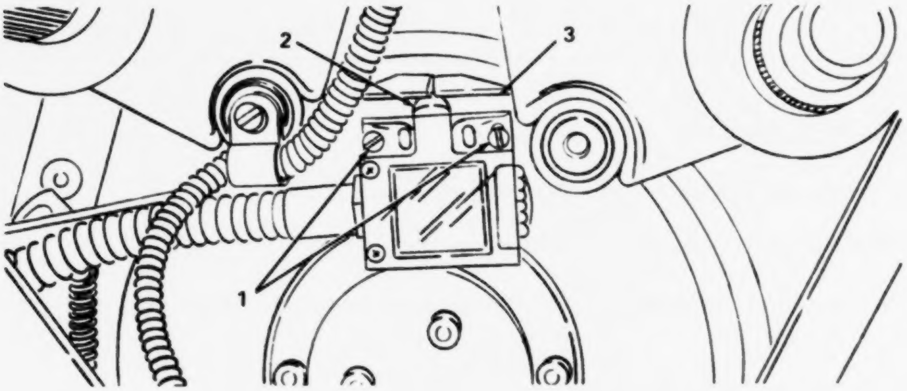


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Figure 2-33. Form Rollers Limit Switch Alinement.

NOTE

FOLLOW-ON MAINTENANCE:
Upper guard (O/S) replaced (para. 2-18).

2-24. Ink Fountain Assembly.

This task covers: a. Remove b. Repair c. Install

INITIAL SETUP

Tools

13 mm combination wrench
22 mm combination wrench
8 mm hex key
Punch, bronze, 8 in.
Hammer, ball-peen

Equipment Conditions

Upper guard (O/S) removed (para. 2-18)
Main guard (D/S) removed (para. 2-20)
Ink ductor roller removed (TM 5-3610-286-10)

Additional Personnel Requirement

Printing and Binding Specialist MOS 83F20

a. *Remove.*

(1) *Ink roller.* (figure 2-34)

(a) Loosen star knobs (Sheet 2, 1) and rotate fountain (2) down.

(b) Remove flexible lubrication line fitting (O/S) (Sheet 1, 3) from clutch (4).

(c) Remove two snap rings (5) and slide cover plate (6) off ink fountain roller (7) shaft end (O/S).

(d) Loosen brake adjusting screw (8) and slide off brake (9).

NOTE

Adjusting screw cannot be removed. Mylar brake shoes may be loose in brake.

(e) Remove nut (10) and washer (11) from bearing pin (12).

(f) Place wedge or block behind head of bearing pin (12).

CAUTION

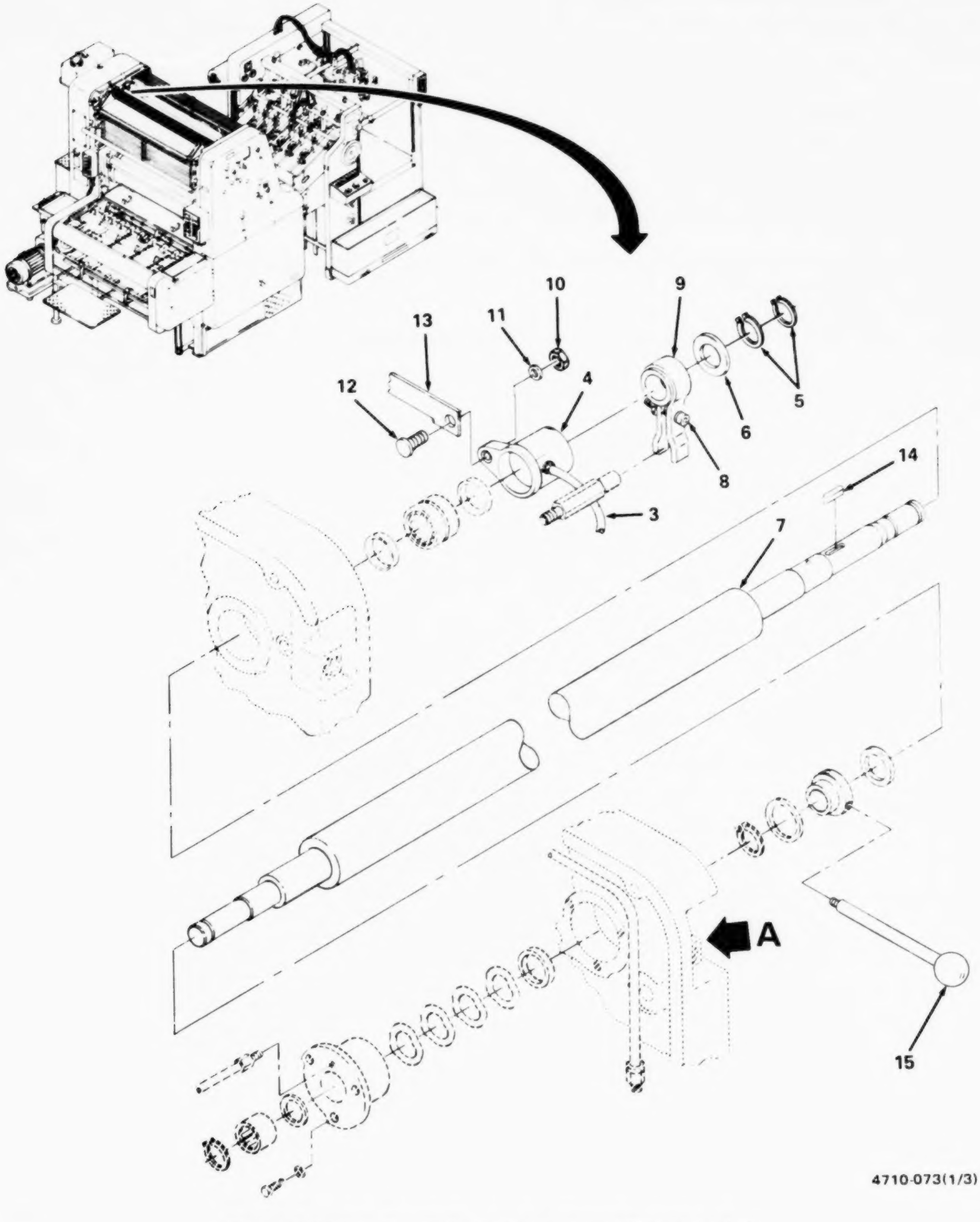
Use care in next step so as not to damage rigid lubrication lines behind bearing pin.

(g) Using bronze punch and ball-peen hammer, drive end of bearing pin (12) in, to free it from clutch (4) and pull rod (13).

(h) Slide off clutch (4).

(i) Using bronze punch and ball-peen hammer, remove woodruff key (14) from ink fountain roller shaft (7).

(j) Unscrew and remove ink fountain roller handle (15).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4710-073(1/3)

Figure 2-34. Ink Fountain Roller Removal (Sheet 1 of 3).

2-24. Ink Fountain Assembly (cont).

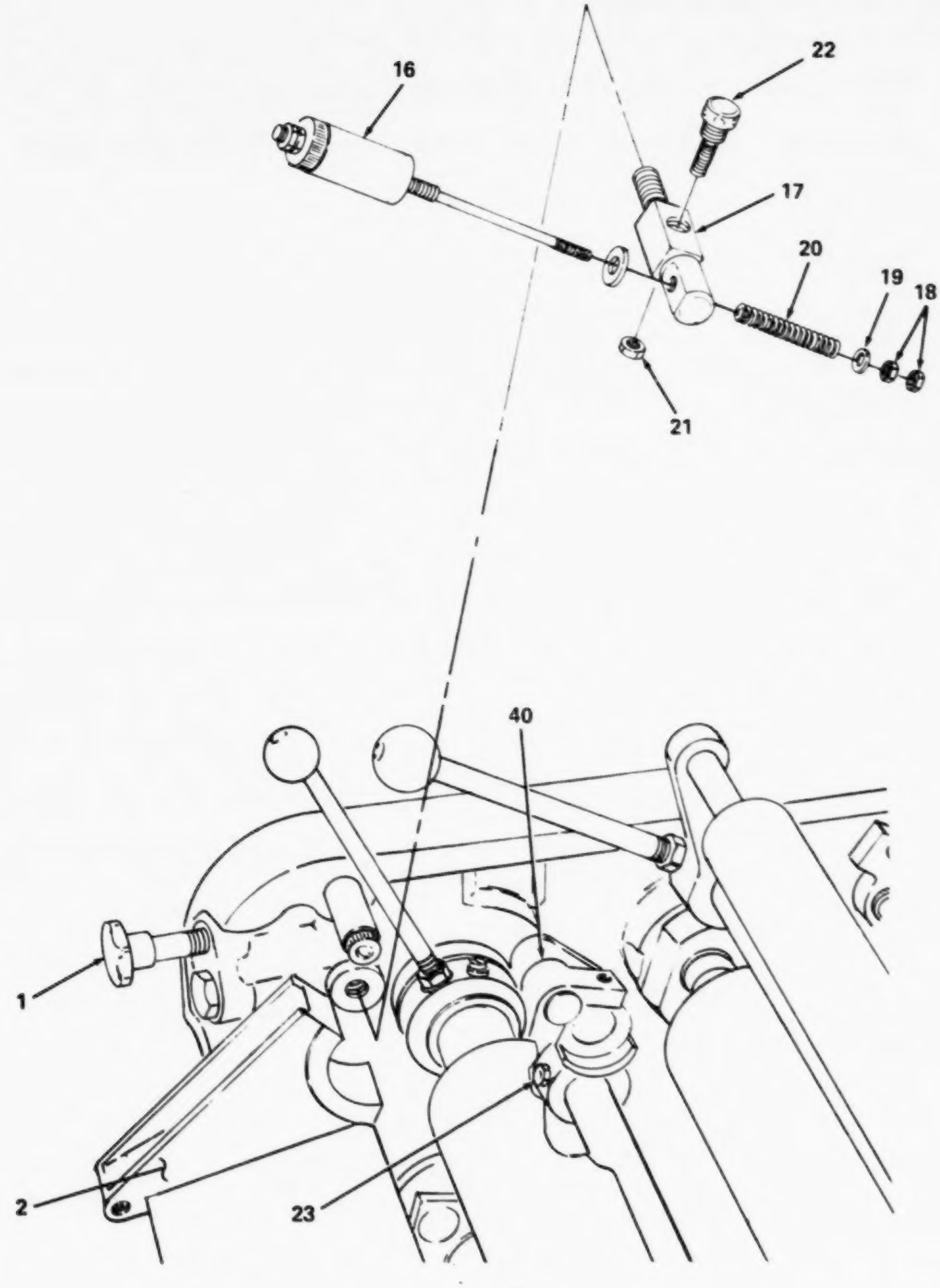
CAUTION

When removing rider roller adjusting rod in next step, the spring (20) is under compression. Be prepared to catch spring when two nuts (18) are removed.

(k) Unscrew rider roller adjusting rod (Sheet 2, 16) until loose in stop (17). Remove two nuts (18), washer (19), spring (20). Pull spindle (16) out of stop (17).

(l) Remove locking nut (21). Using pin wrench, back off adjustable stop screw (22) and remove.

(m) Remove grease fitting (23) on ink ductor roller bearing.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DETAIL A

4710-073(2/3)

Figure 2-34. Ink Fountain Roller Removal (Sheet 2 of 3).

2-24. Ink Fountain Assembly (cont).

(n) Remove grease fitting (Sheet 3, 24) on ink fountain roller clutch (25).

(o) Remove flexible line lubrication fitting (26) from D/S lubrication distribution unit (27).

(p) Remove D/S lubrication fitting (28) from end cap (29).

(q) Remove three hex screws (30), washers (31), and snap ring (32).

(r) Support ink fountain roller with wooden blocks.

(s) Slide off end cap (29) with needle bearing (33) and spacer (34) from ink fountain roller (7) shaft end D/S.

(t) Slide off circular shims (35) and spacer (36).

NOTE

Shims are used to eliminate end play of ink fountain roller. Count number of shims since amount of shims used will vary between TSS presses.

(u) Remove snap ring (37) and slide off washer (38), ink fountain roller clutch assembly (25), and washer (39).

WARNING

Ink fountain roller exceeds 35 pounds and requires two persons for removal.

(v) Depress ductor roller stop lever (O/S) (Sheet 2, 40) out of way and slide ink fountain roller (Sheet 3, 7) out of press through hole in D/S side frame.

NOTE

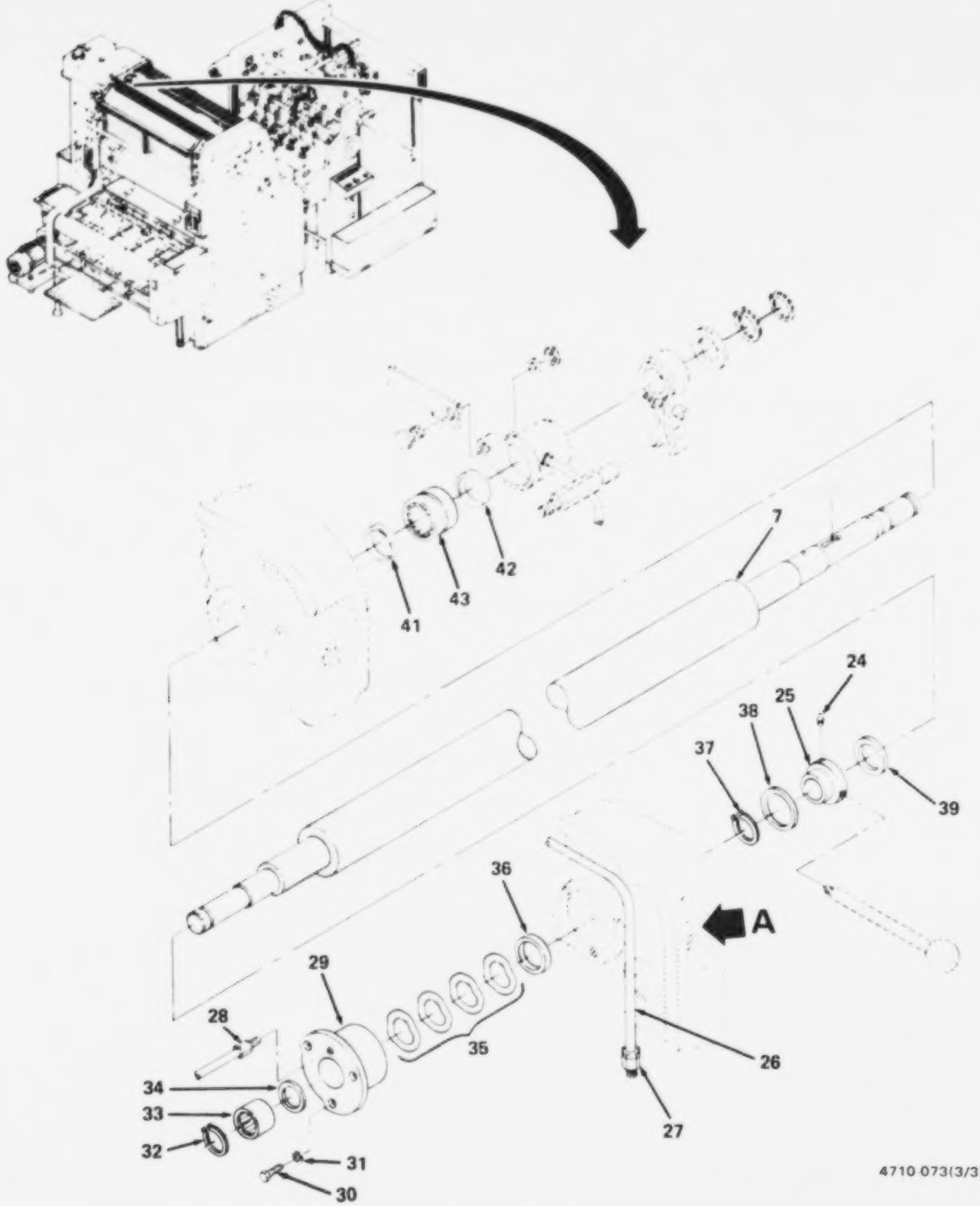
Needle bearing in O/S side plate will remain in place.

(w) Remove inner bushing (41) and outer bushing (42).

NOTE

Inner bushing is wider than outer bushing.

(x) Remove needle bearing (43).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4710-073(3/3)

Figure 2-34. Ink Fountain Roller Removal (Sheet 3 of 3).

2-24. Ink Fountain Assembly (cont).

(2) *Ink fountain.* (figure 2-35)

NOTE

Ink roller must be removed.

(a) Remove two hex-head screws (1) and connecting two links (2).

(b) Tag and remove all rigid line lubrication fittings from lubrication distribution unit (4).

NOTE

Do not remove flexible line fitting.

(c) Remove socket-head screw (3) and lubrication distribution unit (4).

(d) Support ink fountain (5) with wooden blocks.

(e) Loosen two hex bolts (6).

WARNING

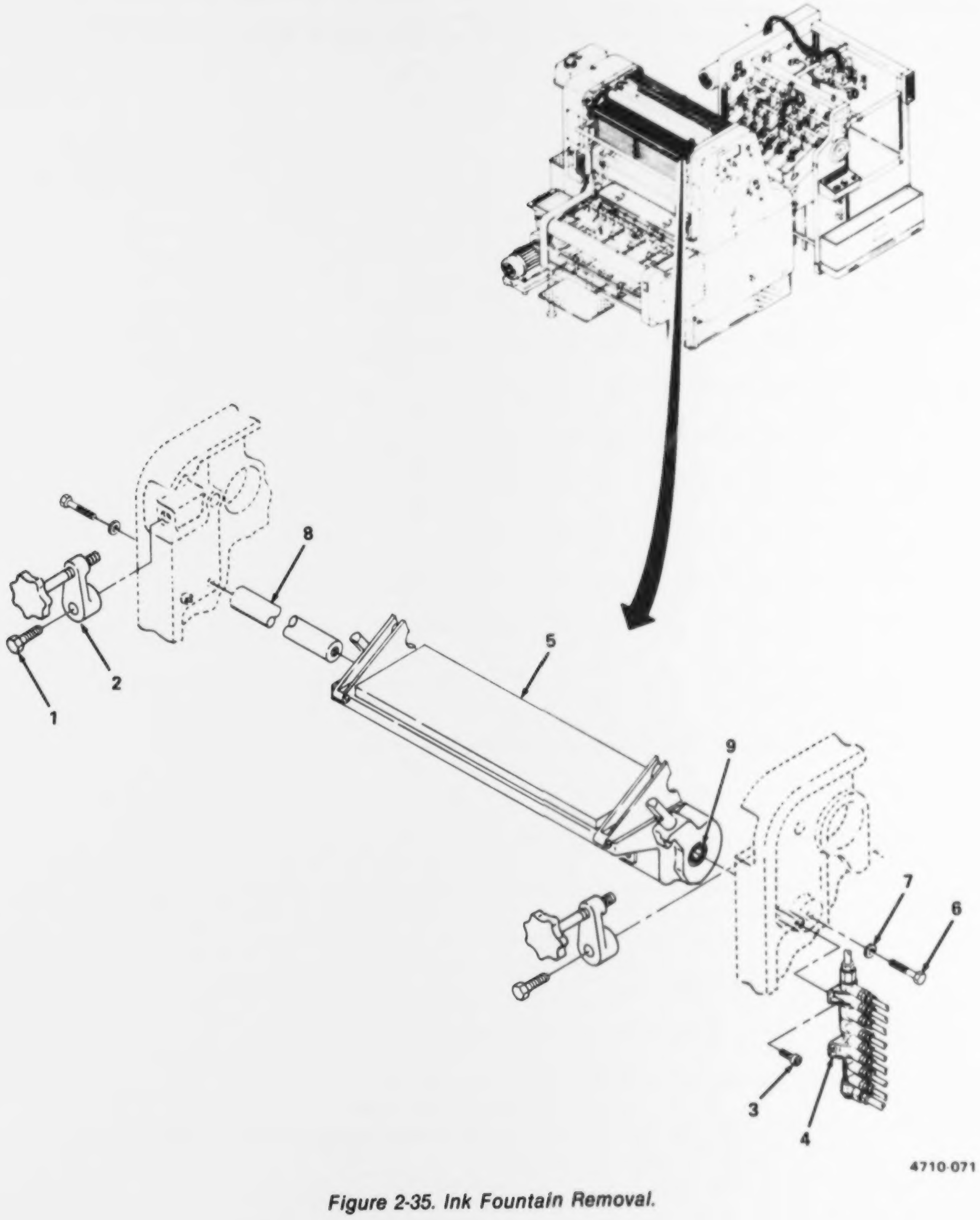
Ink fountain assembly exceeds 35 pounds and requires two persons for removal.

(f) Using two persons, grasp ink fountain (5) on each end, and remove hex bolts (6) and washers (7), and lift ink fountain out of press.

(g) Resting ink fountain on bench, slide out support bar (8).

NOTE

Two support bar bearings (9) remain in ink fountain (5).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4710-071

Figure 2-35. Ink Fountain Removal.

2-24. Ink Fountain Assembly (cont).

b. Repair.

(1) *Ink roller.*

(a) Replace frozen or binding bearings.

(b) Replace frozen or broken clutches.

(c) Replace brake with missing or worn mylar brake shoes.

(d) Replace missing or broken roller handle.

(e) Replace nicked, damaged or scored ink roller.

(f) Replace stripped or worn spindles and stops.

(g) Replace weak or broken spindle springs.

(2) *Ink fountain.* (figure 2-36)

(a) Remove four socket-head screws (1), two end plates (2), and four pins (3).

(b) Remove two socket-head screws (4) and guard (5).

(c) Remove four socket-head screws (6), four washers (7) and ink fountain blade (8).

(d) Remove twenty six ink fountain keys (9), compression springs (10), pins (11) and "E" clips (12).

(e) Remove four ribbed nails (13) and indicator plate (14).

(f) Drive out bearings (15) from ink fountain (16).

(g) Remove two star knobs (17).

(h) Replace weak or broken springs and dented or nicked blade. Replace missing or stripped keys and frozen or binding bearings. Replace damaged end plates and damaged or missing star knobs. Replace dented or unreadable indicator plate.

(i) Replace two star knobs (17).

(j) Replace two bearings (15) in ink fountain (16).

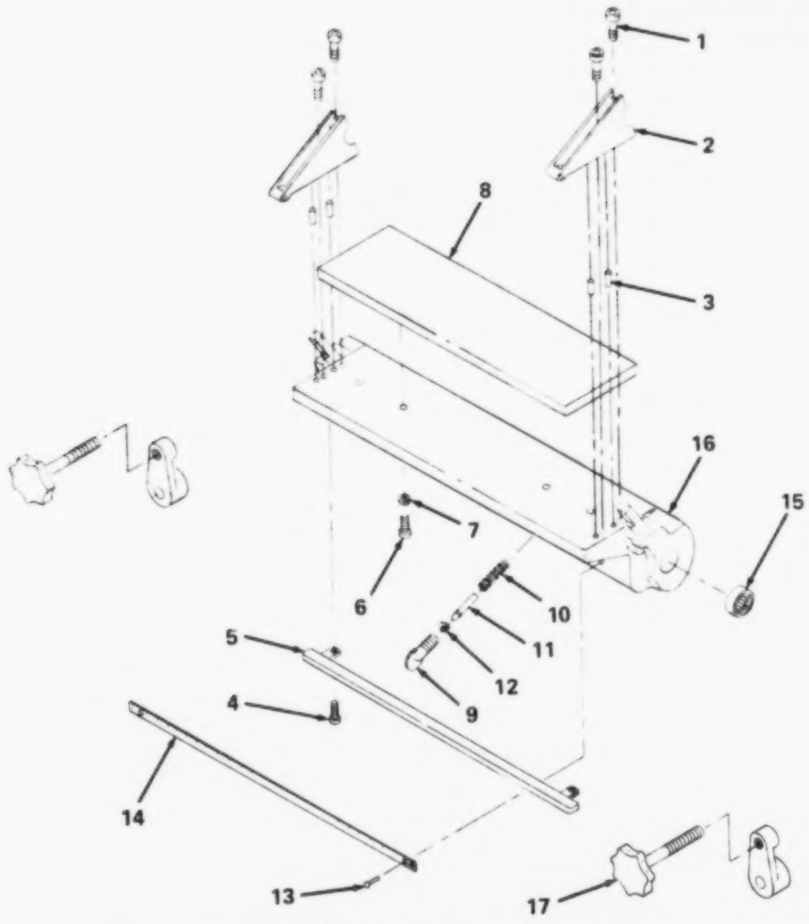
(k) Replace indicator plate (14) and four ribbed nails (13).

(l) Replace "E" clips (12), pins (11) and compression springs (10) on ink fountain keys (9) and replace keys.

(m) Replace ink fountain blade (8), washers (7), and four socket-head screws (6).

(n) Replace guard (5) and two socket-head screws (4).

(o) Replace four pins (3), end plates (2), and four socket-head screws (1).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4710-072

Figure 2-36. Ink Fountain Repair.

2-24. Ink Fountain Assembly (cont).

c. *Install.*

(1) *Ink fountain.* (figure 2-37)

(a) Slide support bar (1) through bearings (2) in ink fountain (3) until each end of support bar is flush with ink fountain side surfaces.

(b) Place wooden blocks in press to support ink fountain assembly.

WARNING

Ink fountain assembly exceeds 35 pounds and requires two persons for replacement.

(c) Using two persons, grasp ink fountain (3) on each end and install in press, resting on blocks.

(d) Aline threaded holes in each end of support bar (1) with holes in O/S and D/S frames, and install washers (4), hex bolts (5), and tighen bolts.

(e) Install lubrication distribution unit (6) and socket-head screw (7) and tighten screw.

(f) Install all rigid tube lubrication fittings on lubrication distribution unit (6) and remove tags.

(g) Install two connecting links (8) and hex-head screws (9).

(h) Install ink roller.

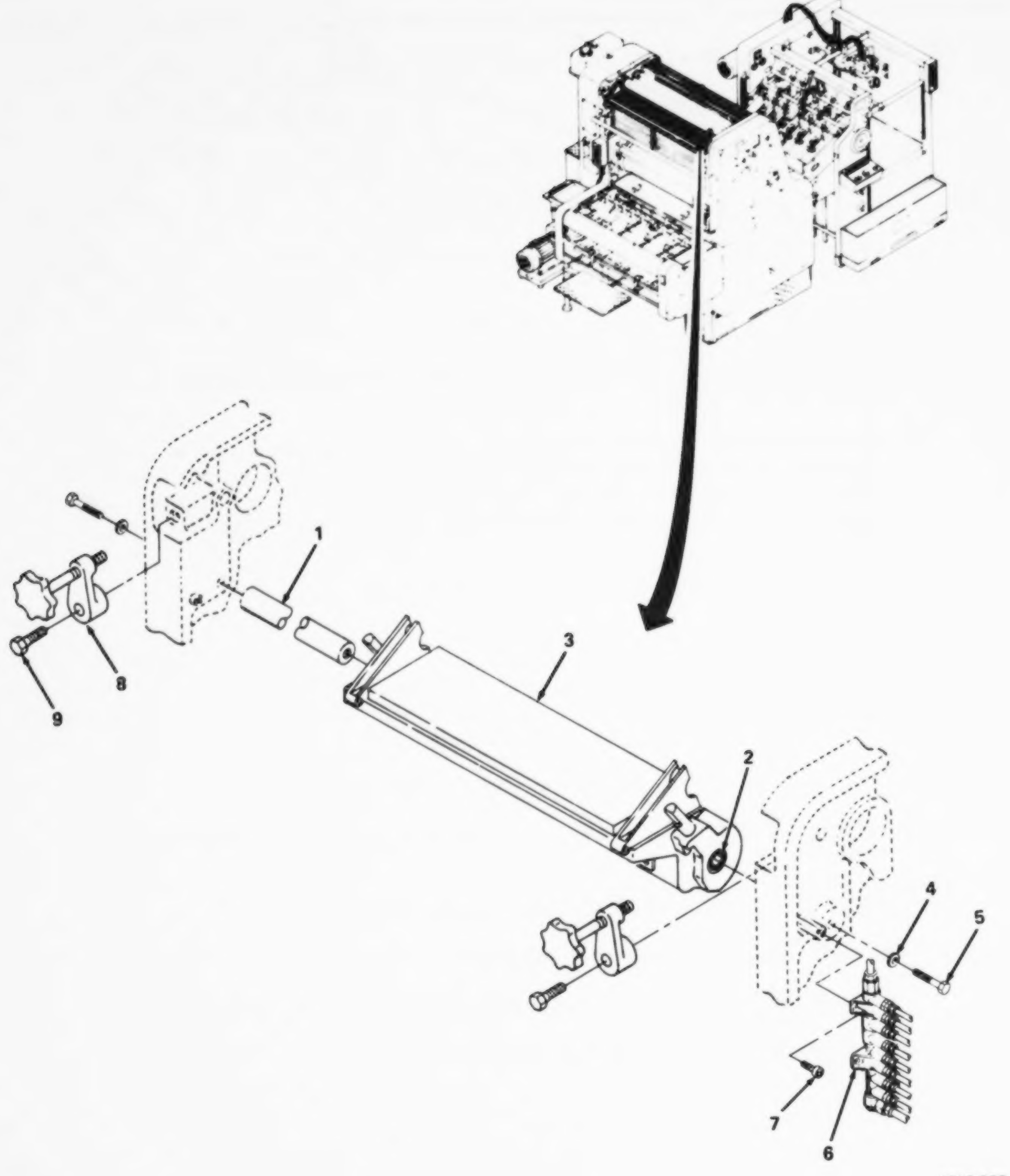
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Figure 2-37. Ink Fountain Installation.

2-24. Ink Fontain Assembly (cont).

(2) *Ink roller.* (figure 2-38)

(a) Install needle bearing (1).

(b) Install inner bushing (2) and outer bushings (3).

WARNING

Ink fountain roller exceeds 35 pounds and requires two persons for installation.

CAUTION

When performing next step, use care not to loosen or damage O/S side plate needle bearing.

(c) Place supporting wooden blocks in press to hold ink fountain roller. Using two persons, depress ink ductor roller stop lever (Sheet 2, 4) out of way. Slide ink fountain roller (Sheet 1, 5) through hole in D/S side frame into press until O/S end of roller shaft passes through needle bearing (1) and bushings (2, 3) in O/S side frame. Rest roller on support blocks.

(d) Install washer (6) and clutch assembly (7) on ink roller (5).

(e) Install washer (8) and snap ring (9).

(f) Install spacer (10) and circular shims (11).

NOTE

Install same number of shims as were removed.

(g) Install end cap (12), spacer (13), and needle bearing (14) with lubrication fitting hole at top.

(h) Install snap ring (15), three washers (16), and three hex screws (17).

(i) Install D/S lubrication fitting (18) on end cap (12).

(j) Replace flexible line lubrication fitting (19) on D/S lubrication distribution unit (20).

(k) Install grease fitting (21) on ink fountain roller clutch (7).

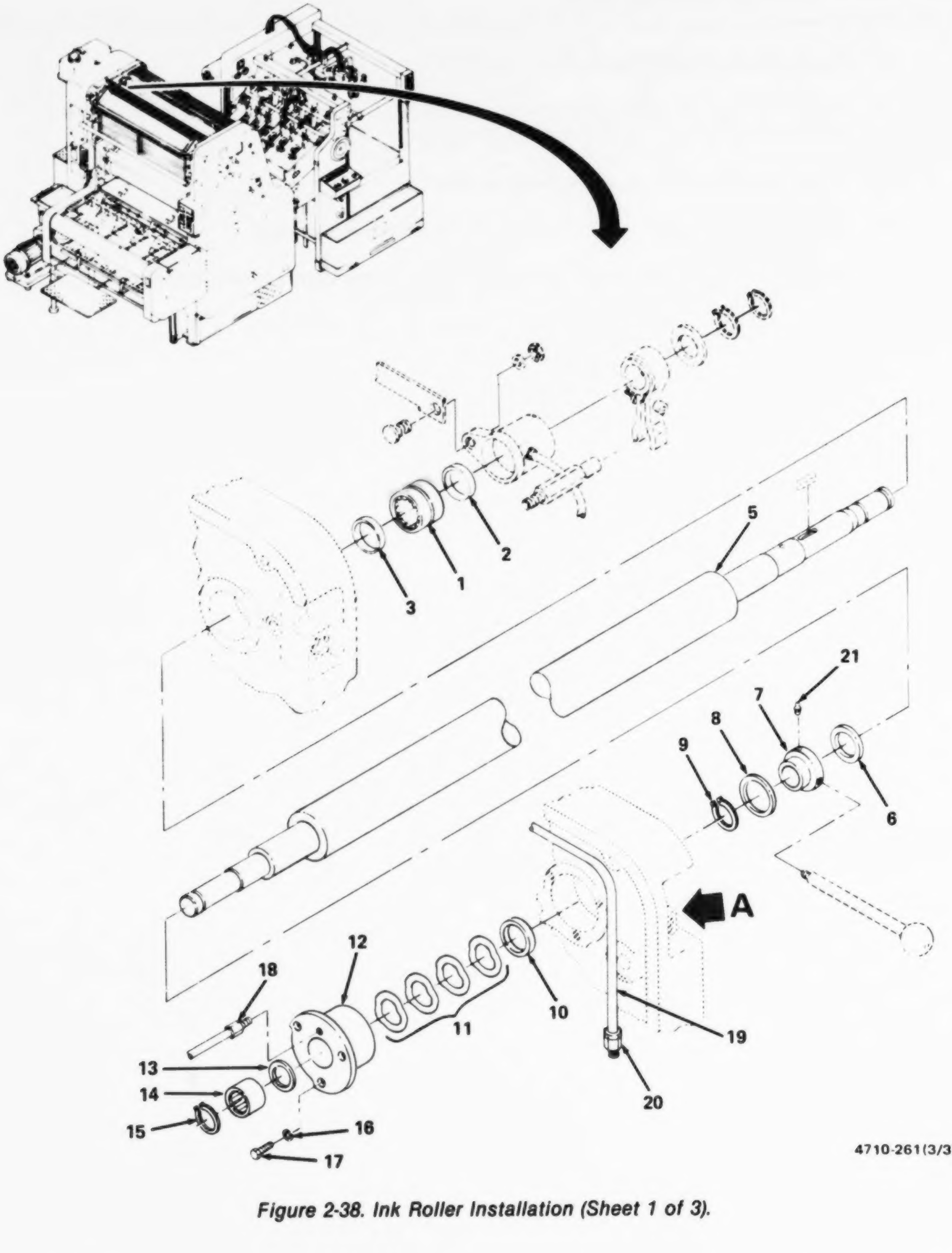
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Figure 2-38. Ink Roller Installation (Sheet 1 of 3).

2-24. Ink Fountain Assembly (cont).

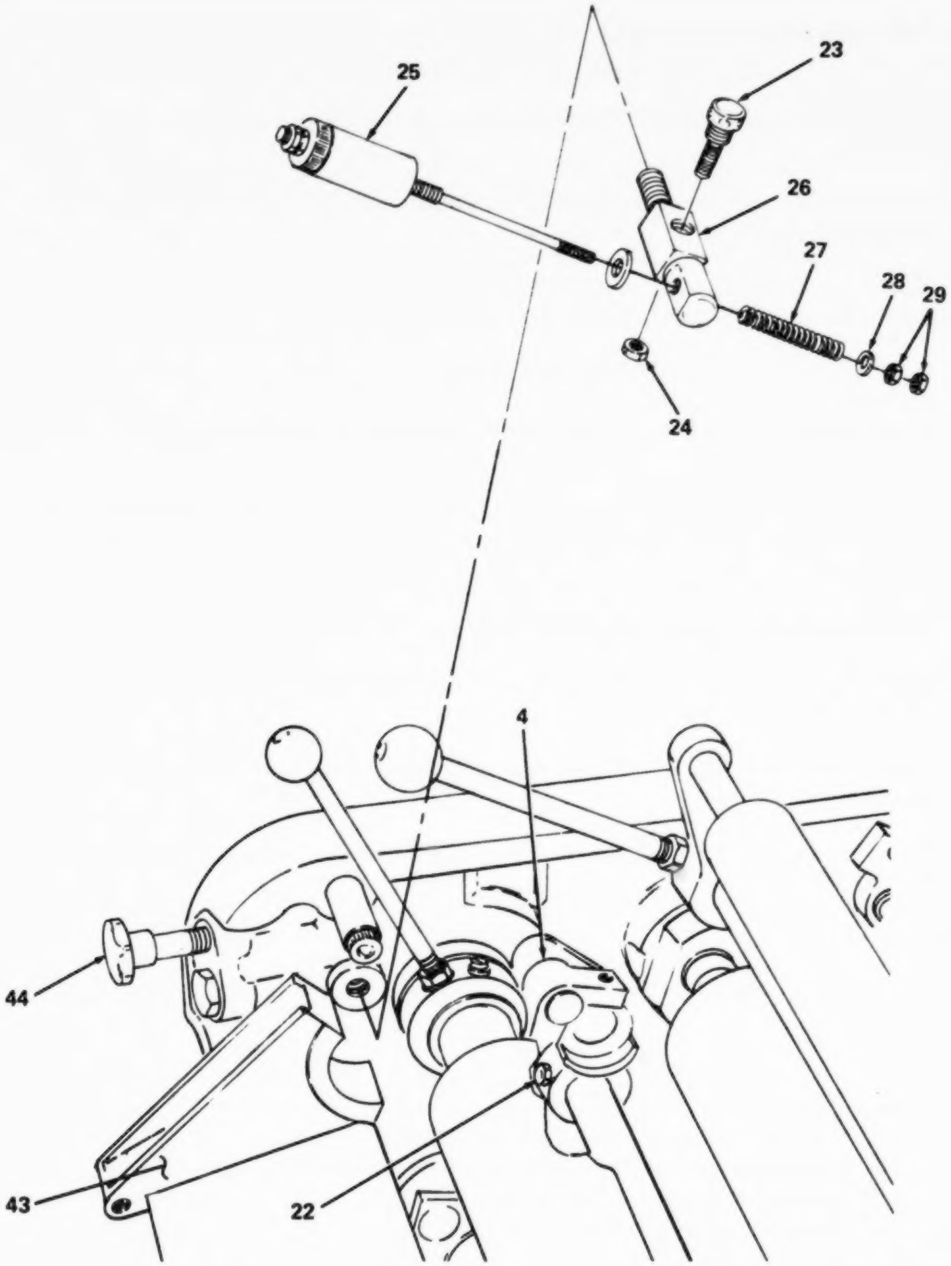
(l) Install grease fitting (Sheet 2, 22) on ink ductor roller bearing.

(m) Install ink fountain stop adjustable stop screw (23) and using pin wrench, install screw until white ring on screw is flush with stop

(n) Install adjustable stop screw locking nut (24).

(o) Install D/S ink fountain roller stop spindle (25) loosely in stop (26).

(p) Install spring (27), washer (28), and two nuts (29). Screw spindle further into stop.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DETAIL A

4710-261(2/3)

Figure 2-38. Ink Roller Installation (Sheet 2 of 3).

2-24. Ink Fountain Assembly (cont).

(q) Install ink fountain roller handle (Sheet 2, 30) in threaded hole in ink fountain clutch (7).

(r) Using bronze punch and ball-peen hammer, install woodruff key (31) in slot in ink fountain roller (5) shaft.

(s) Slide clutch (32) onto ink roller shaft (5). Aline hole in top of clutch (32) with pull rod (33) and bearing pins (34).

CAUTION

Use care in performing next step so as not to damage rigid lubrication lines behind bearing pin.

(t) Using wooden wedge, bronze punch, and ball-peen hammer, push bearing pin head (34) so that bearing pin passes through hole in clutch far enough to expose several threads on pin.

(u) Install and tighten washer (35) and nut (36).

(v) Install brake (37) on ink fountain roller shaft (5) so that brake extensions straddle brake pin (38). Tighten brake screw (39).

(w) Install cover plate (40) and two snap rings (41). Install flexible lubrication line fitting (42) onto clutch (32).

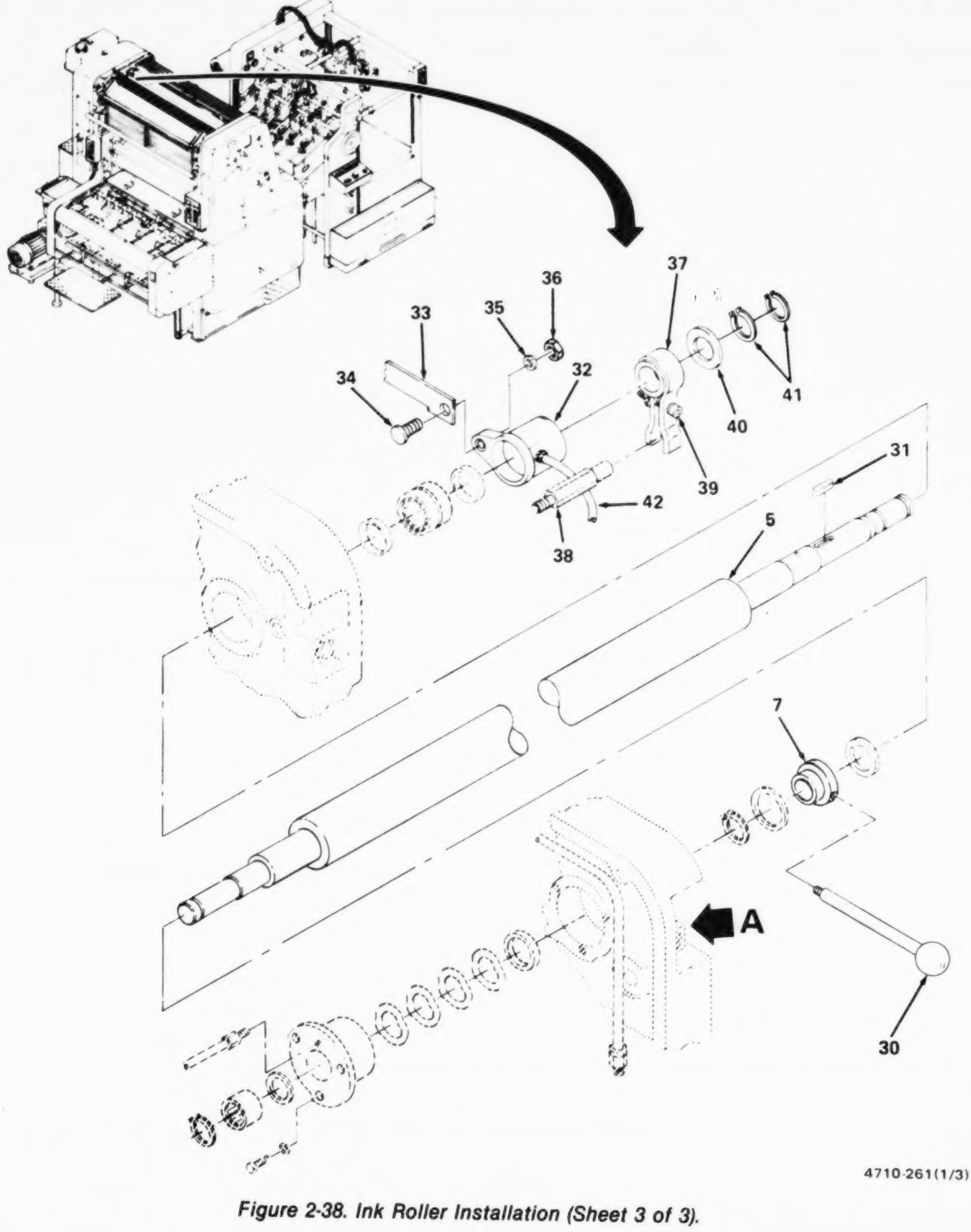
(x) Rotate ink fountain assembly (Sheet 2, 43) up and lock in place with star knobs (Detail A-44).

CAUTION

Remove all wooden support blocks from press.

NOTE

FOLLOW-ON MAINTENANCE:
(1) Replace ink ductor roller (TM 5-3610-286-20).
(2) Adjust ink fountain roller stop spindles (TM 5-3610-286-20).
(3) Replace upper guard (O/S) (para. 2-18).
(4) Replace main guard (D/S) (para. 2-20).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4710-261(1/3)

Figure 2-38. Ink Roller Installation (Sheet 3 of 3).

2-25. Roller Guide Rail Assemblies.

This task covers: a. Replace b. Repair

INITIAL SETUP

Tools	*Equipment Conditions*
5 mm hex key 6 mm hex key 8 mm hex key	Inking rollers no. 7, 8, 9, 10, 11, 12, and 13 removed (TM 5-3610-286-10)

---

a. *Replace*. (figure 2-39)

NOTE

Removal procedure for D/S of press shown. Procedure for O/S side is the same.

(1) Remove two socket-head screws (1).

(2) Remove roller guide rail (2) through delivery end of press. Rotate as required to clear dampening rollers.

(3) Replace roller guide rail (2) through delivery end of press and aline hole in roller guide closest to press side frame with locating stud (3) in press side frame.

(4) Replace two socket-head screws (1).

b. *Repair*. (figure 2-40)

(1) Remove socket-head screw (1), latch (2), and set screw (3).

(2) Loosen lock nut (4) and remove knurled locking screw (5) and socket-head screw (6).

(3) Replace missing or stripped screw (5, 6).

(4) Tighten lock nut (4).

(5) Replace missing set screw (3).

(6) Replace bent or damaged latch (2) and replace socket-head screw (1).

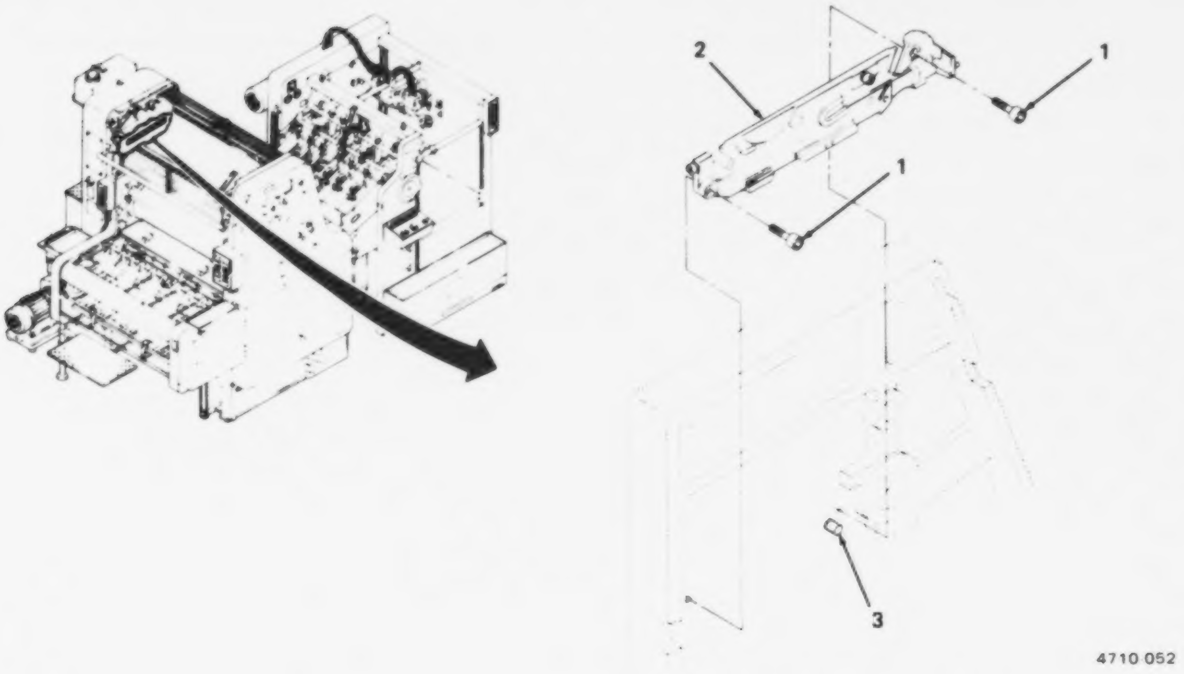
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Figure 2-39. Roller Guide Rail Replacement (D/S Shown).

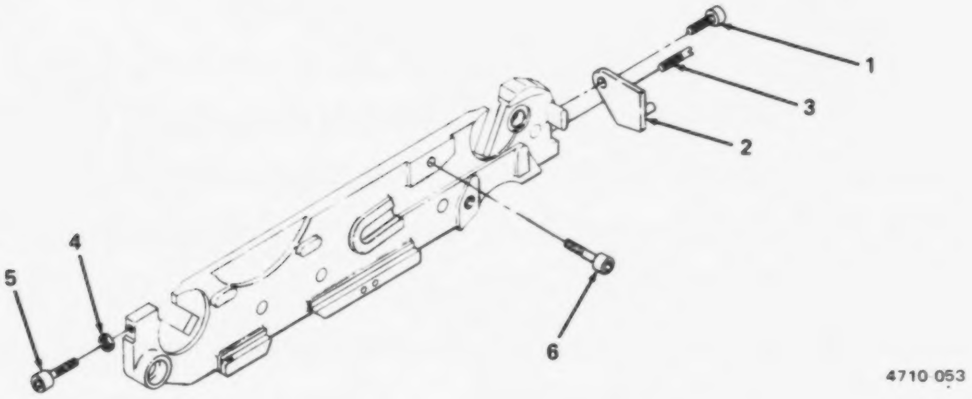
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Figure 2-40. Roller Guide Assembly Repair.

2-26. Oscillator Lever Assemblies.

This task covers: a. Remove b. Repair c. Install

INITIAL SETUP

Tools

Retaining-ring pliers
10 mm combination wrench
17 mm combination wrench
19 mm combination wrench
30 mm combination wrench
Spanner wrench
5 mm hex key
6 mm hex key
10 mm hex key
4 mm pin punch
5 mm pin punch
Ball-peen hammer
Bushing driver set

Equipment Conditions

Main guard assembly (D/S) removed (para. 2-20)

a. Remove. (figure 2-41)

(1) Remove two spring pins (1), crown nut (2), and washer (3).

(2) Remove two spanner nuts (4) and two retainer washers (5).

(3) Loosen hex nut (6) and remove oscillator lever (7).

(4) Remove hex nut (8), washer (9), and pull rod (10).

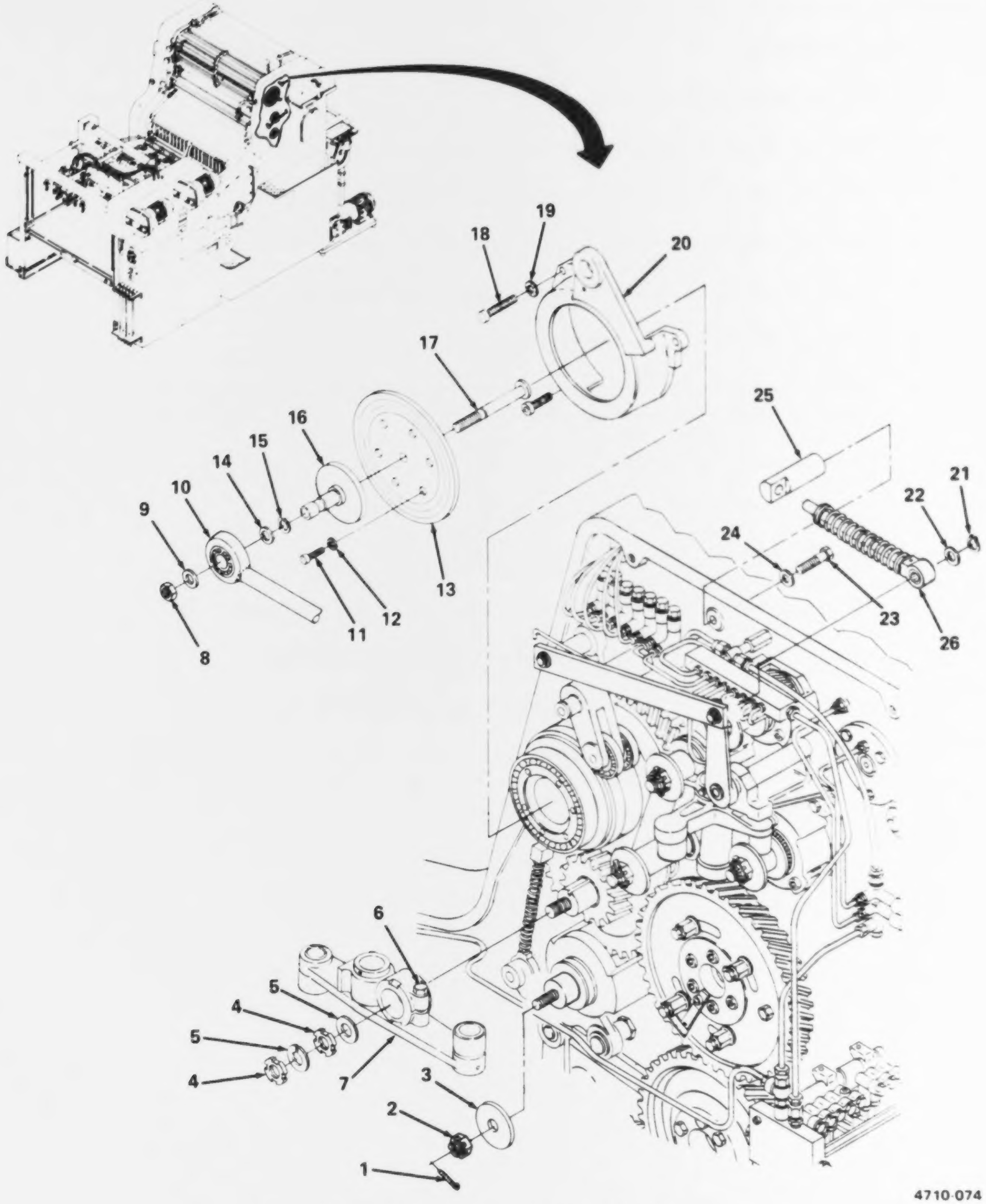
(5) Remove six socket-head screws (11), washers (12), and bushing (13).

(6) Remove retaining ring (14), washer (15), flange (16), and screw (17).

(7) Remove three socket-head screws (18), washer (19), and bearing housing (20).

(8) Remove retaining ring (21) and washer (22).

(9) Remove hex screw (23), washer (24), spring rod guide (25), and spring rod assembly (26).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4710-074

Figure 2-41. Oscillator Lever Assemblies Removal.

2-26. Oscillator Lever Assemblies (cont).

b. Repair. (figure 2-42)

(1) Remove spring pin (1) and set collar (2).

(2) Remove bushing (3), hex screw (4), washer (5), and lever clamp (6).

(3) Remove spring pins (7) and cam followers (8) from oscillator lever (9).

(4) Remove screw (10) and oil distribution plate (11) from bearing housing (12).

(5) Remove washers (13), spring (14), spring pin (15), and spring rod (16).

(6) Remove bushing (17) from rod head (18).

(7) Replace any broken, cracked, distorted, missing, or excessively worn items removed or disassembled in steps (1) through (6) or in paragraph a, steps (1) through (9) above.

(8) Replace bushing (17) in rod head (18).

(9) Replace spring rod (16) and spring pin (15) in rod head (18).

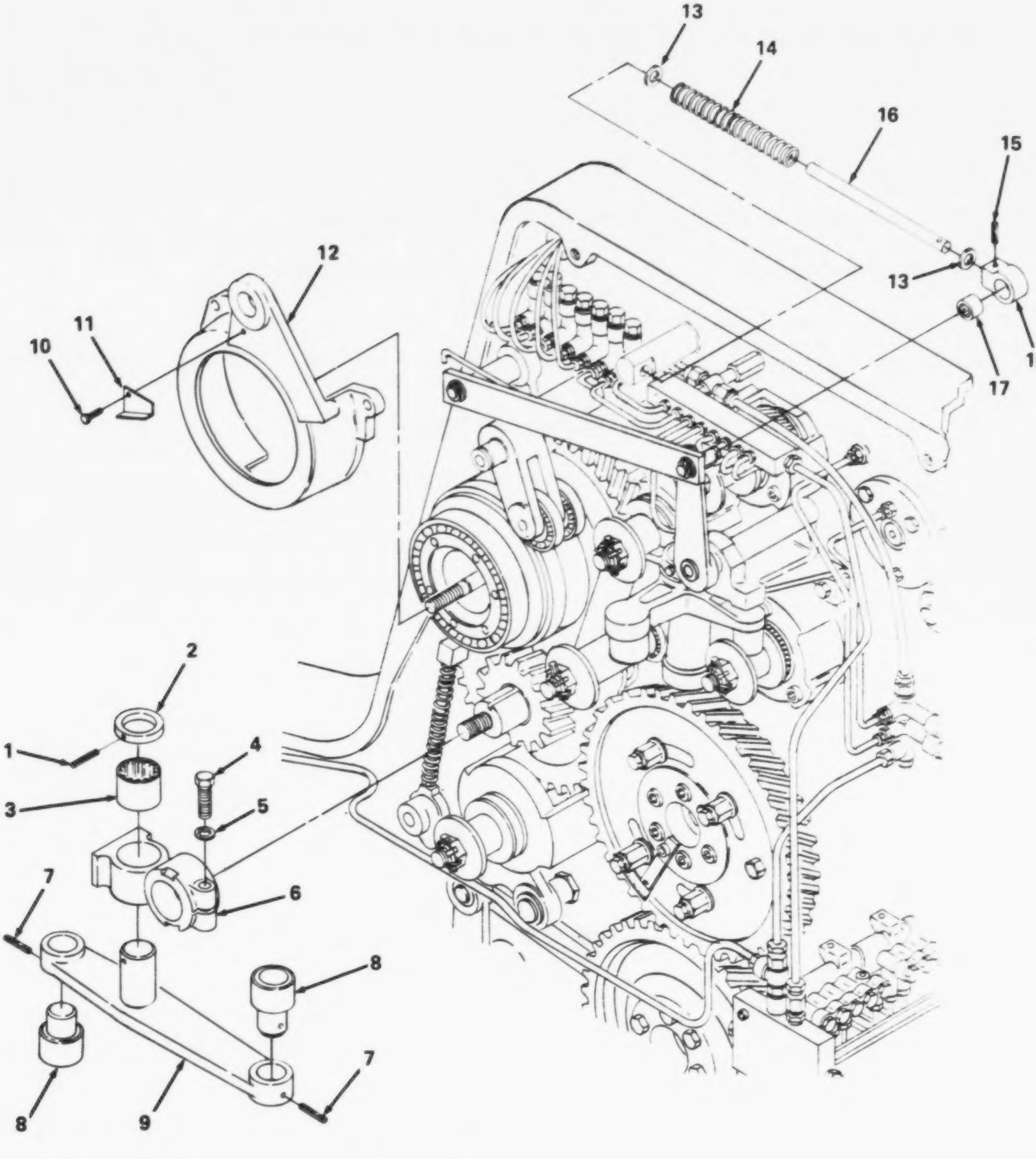
(10) Replace washers (13) and spring (14) on rod (16).

(11) Replace oil distribution plate (11) and hex screw (10) on bearing housing (12).

(12) Replace cam followers (8) and spring pins (7) on oscillator lever (9).

(13) Replace bushing (3), lever clamp (6), washer (5), and hex screw (4).

(14) Replace set collar (2) and spring pin (1).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4710-075

Figure 2-42. Oscillator Lever Assemblies Repair.

2-26. Oscillator Lever Assemblies (cont).

c. *Install.* (figure 2-43)

(1) Install spring rod assembly (1), spring rod guide (2), washer (3), and hex screw (4).

(2) Install washer (5) and retaining ring (6).

(3) Install bearing housing (7), washer (8), and three socket-head screws (9).

(4) Install screw (10), flange (11), retaining ring (12), and washer (13).

(5) Install bushing (14), six washers (15), and socket-head screws (16).

(6) Install pull rod (17), washer (18), and hex nut (19).

(7) Install oscillator lever (20).

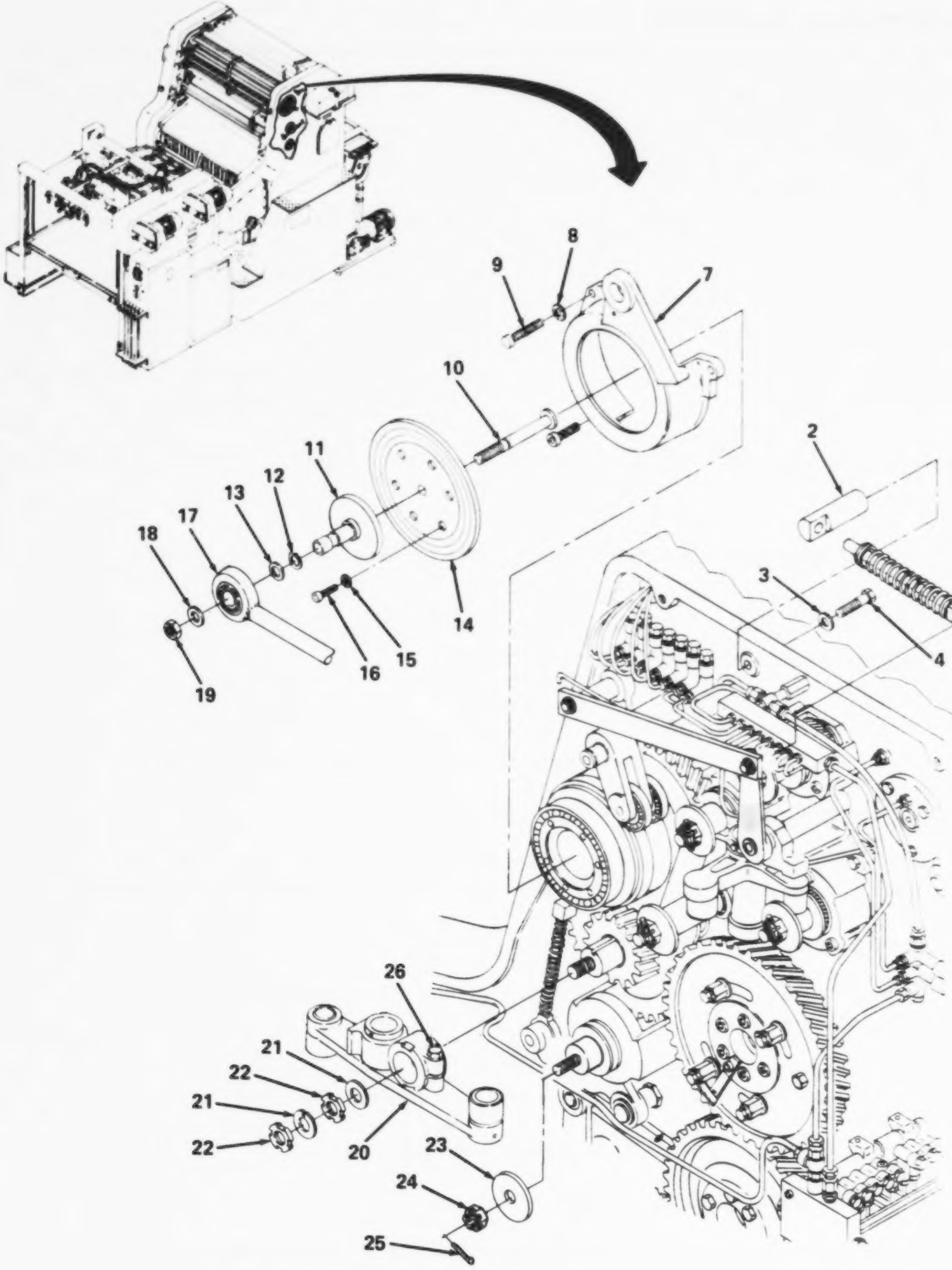
(8) Install retainer washers (21) and spanner nuts (22).

(9) Install washer (23), crown nut (24), and spring pin (25).

(10) Aline oscillator and tighten hex screw (26).

NOTE

FOLLOW-ON MAINTENANCE:
Install main guard assembly (D/S) (para. 2-20).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4710-235

Figure 2-43. Oscillator Lever Assemblies Installation.

2-27. Swivel Lever Assemblies.

This task covers: a. Remove b. Repair c. Install d. Adjust

INITIAL SETUP

Tools

5 mm hex key
6 mm hex key
3 mm pin punch
8 mm pin punch
Ball-peen hammer
Flat-tip screwdriver

Equipment Conditions

Upper guard and accessories (O/S) removed (para. 2-18)
Inking form rollers removed (TM 5-3610-286-10)
Ink oscillator rollers removed (coupling type – TM 5-3610-286-10, solid type, para. 2-33)

NOTE

All maintenance procedures are the same for both sets of swivel levers.

a. Remove. (figure 2-44)

(1) Remove two colored caps (1) and spacer bushings (2).

NOTE

There are two ball bearings (four total) in each journal box housing.

(2) Remove two retaining rings (3).

(3) Placing one hand under locking sleeves (4) to catch bearings (5), carefully remove locking sleeve (4) and gasket (6), catching bearings that may drop from journal box (7).

(4) Remove remaining ball bearings (5) from journal box (7).

(5) Remove two retaining rings (8), two journals (9), and journal boxes (7) from inside press. Remove shims (10).

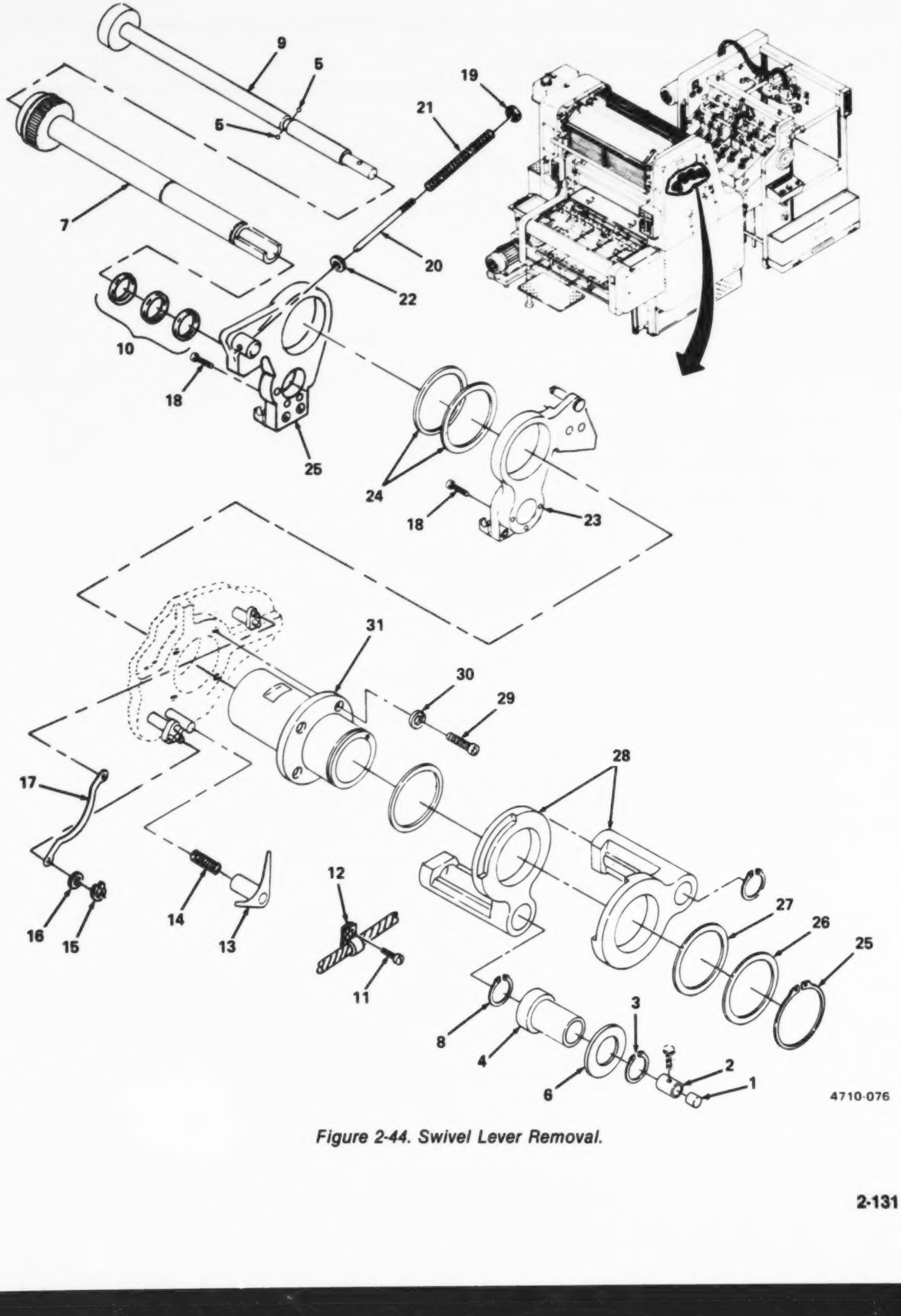
(6) Remove screw (11) and cable clamp (12). Place cable where it will not interfere with maintenance being performed. Remove stop piece (13) and spring (14).

(7) Remove two retaining rings (15), washers (16), and pull rod (17).

(8) Remove six socket-head screws (18).

(9) Loosen locking hex nut (19). Remove spring rod (20), spring (21), and washer (22).

(10) Remove journal box housing (23), shims (24), and journal box housing (25).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4710-076

Figure 2-44. Swivel Lever Removal.

2-27. Swivel Lever Assemblies (cont).

b. Repair. (figure 2-45)

(1) Remove retaining ring (1), washer (2), rod head (3), and pin (4).

(2) Remove two socket-head screws (5), washers (6), and adjusting gears (7).

(3) Remove spring rod guide (8).

(4) Remove worm gear (9) and washer (10).

(5) Replace any broken, cracked, bent, or distorted components.

(6) Replace worm gear (9) and washer (10).

(7) Replace spring rod guide (8).

(8) Replace adjusting gear (7), two screws (5), and washers (6).

(9) Replace pin (4), spring rod head (3), washer (2), and retaining ring (1).

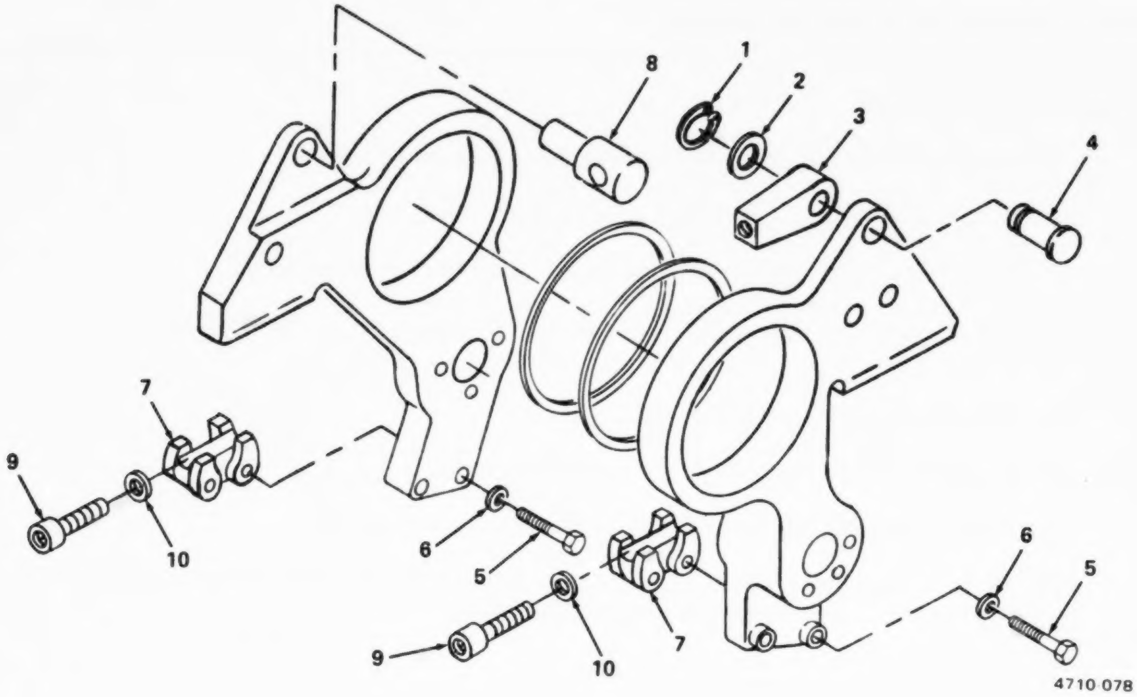
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Figure 2-45. Swivel Lever Repair.

2-27. Swivel Lever Assemblies (cont).

c. *Install.* (figure 2-46)

(1) Install bearing (1), washers (2), and three socket-head screws (3).

(2) Install swivel levers (4), shim (5), spacer (6), and retaining ring (7).

(3) Install journal box housing (8), shims (9), and journal box housing (10).

(4) Install spring rod (11), spring (12), washer (13), and locking hex nut (14). Tighten lock nut.

(5) Install six socket-head screws (15).

(6) Install pull rod (16), washers (17), and retaining ring (18).

(7) Install spring (19), stop piece (20), cable clamp (21), and screw (22).

(8) Insert journals (23) in journal boxes (24). Install shims (25) and insert journal box (24) through journal box housing (8) and swivel levers (4).

(9) Install retaining ring (26).

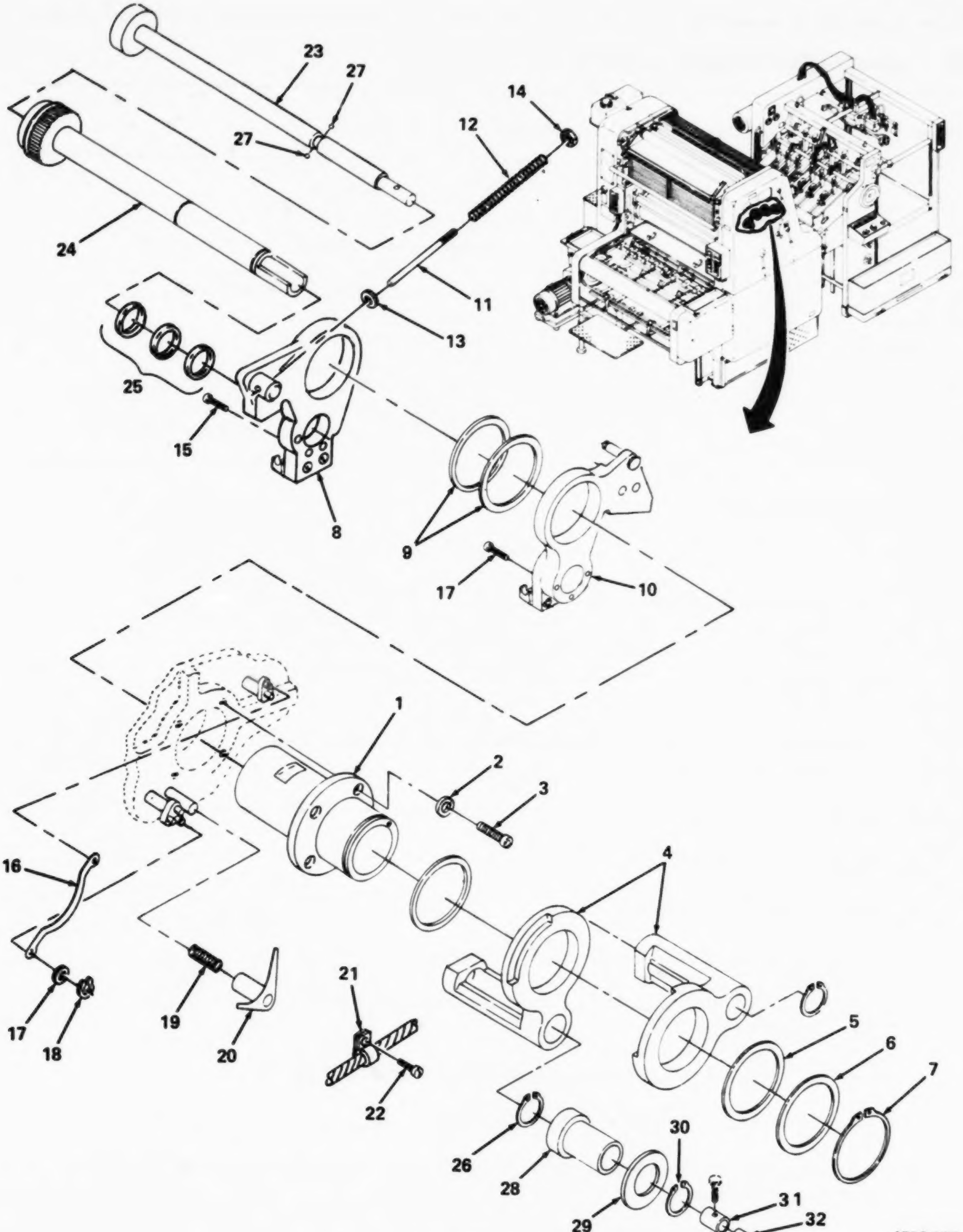
(10) Install ball bearing (27), lock sleeve (28), and gasket (29).

(11) Install retaining ring (30), spacer (31), and colored cap (32).

d. *Adjust.* Adjustment of swivel levers is covered in TM 5-3610-286-10.

NOTE

FOLLOW-ON MAINTENANCE:
(1) Install ink oscillator rollers (TM 5-3610-286-10).
(2) Install form rollers (TM 5-3610-286-10).
(3) Install upper guard and accessories (O/S) (para. 2-18).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4710-220

Figure 2-46. Swivel Lever Installation.

2-28. Journal Box Housing Assembly.

This task covers: a. Remove b. Repair c. Install

INITIAL SETUP

Tools	*Equipment Conditions*
5 mm hex key 6 mm hex key 11 mm combination wrench 13 mm combination wrench 3 mm pin punch 8 mm pin punch Ball-peen hammer	Main guard assembly (D/S) removed (para. 2-20) Inking form rollers removed (TM 5-3610-286-10) Ink oscillator rollers removed (coupling type – TM 5-3610-286-10, solid type, para. 2-33) Roller Guide Rail Assemblies (para. 2-25)

a. Remove. (figure 2-47).

NOTE

- Procedure is for journal box housings 0303 and 0305, (the housing on D/S closest to delivery end of press). Procedure for journal box housings 0304 and 0306, (journal box nearer to feeder end), is similar except these journal box housings must be removed from feeder end of press.

- Journal box housings on O/S are removed with the swivel lever assemblies (para. 2-27).

(1) Loosen lock nut (1) and remove spring rod (2), spring (3) and nut (1).

(2) Remove rod head (4), retaining ring (5), washer (6), and pin (7).

(3) Remove lubrication line (8).

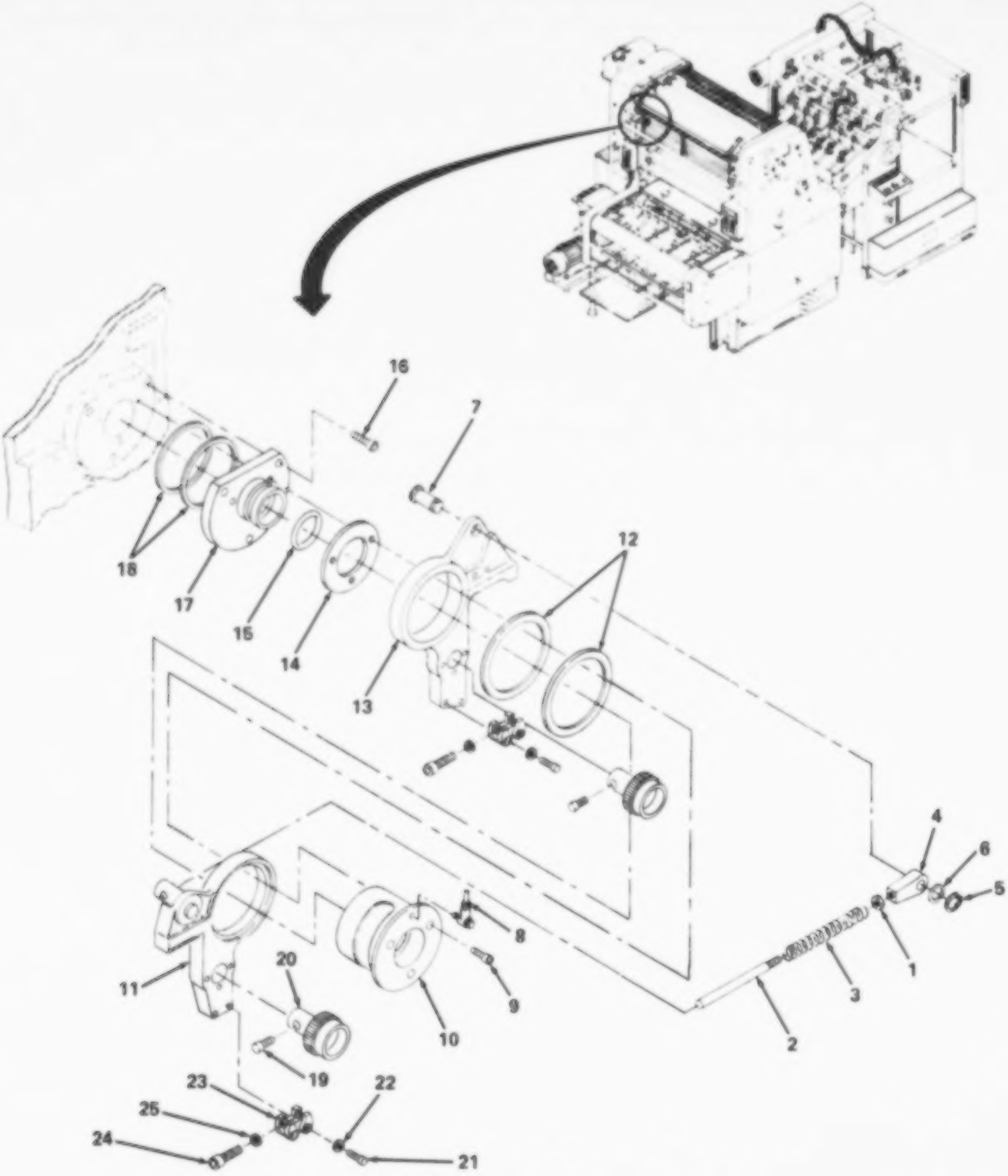
(4) Remove three socket-head screws (9) and bearing (10).

(5) Remove journal box housing (11), spacers (12), journal box housing (13), retaining ring (14), and gasket (15).

(6) Remove three socket-head screws (16), bearing (17) and gaskets (18).

(7) Remove hex-head screw (19) and journal box (20).

(8) Remove two socket-head screws (21), two washers (22), worm gear housing (23), worm gear (24), and spacer (25).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4710-056

Figure 2-47. Journal Box Housing Assembly Removal.

2-28. Journal Box Housing Assembly (cont).

b. *Repair.*

(1) Replace broken or weak compression spring.

(2) Replace worn or binding worm gears.

(3) Replace frozen or binding bearing.

(4) Replace compressed or torn gaskets.

c. *Install.* (figure 2-48)

(1) Replace worm gear (1), spacer (2), worm gear housing (3), two washers (4), and two socket-head screws (5).

(2) Replace journal box (6) and hex-head screw (7).

(3) Replace bearing (8), gaskets (9), and three socket-head screws (10).

(4) Replace retaining ring (11), gasket (12), journal box housing (13), spacers (14), journal box housing (15), and bearing (16).

(5) Replace three socket-head screws (17).

(6) Replace lubrication line (18).

(7) Replace pin (19), rod head (20), washer (21), retaining ring (22), and hex nut (23).

(8) Replace spring rod (24), compression spring (25), and tighten hex nut (23).

NOTE

FOLLOW-ON MAINTENANCE:
(1) Install roller guide assemblies (para. 2-25)
(2) Install ink oscillator rollers (TM 5-3610-286-10).
(3) Install inking form rollers (TM 5-3610-286-10).
(4) Install main guard assembly (D/S) (para. 2-20).

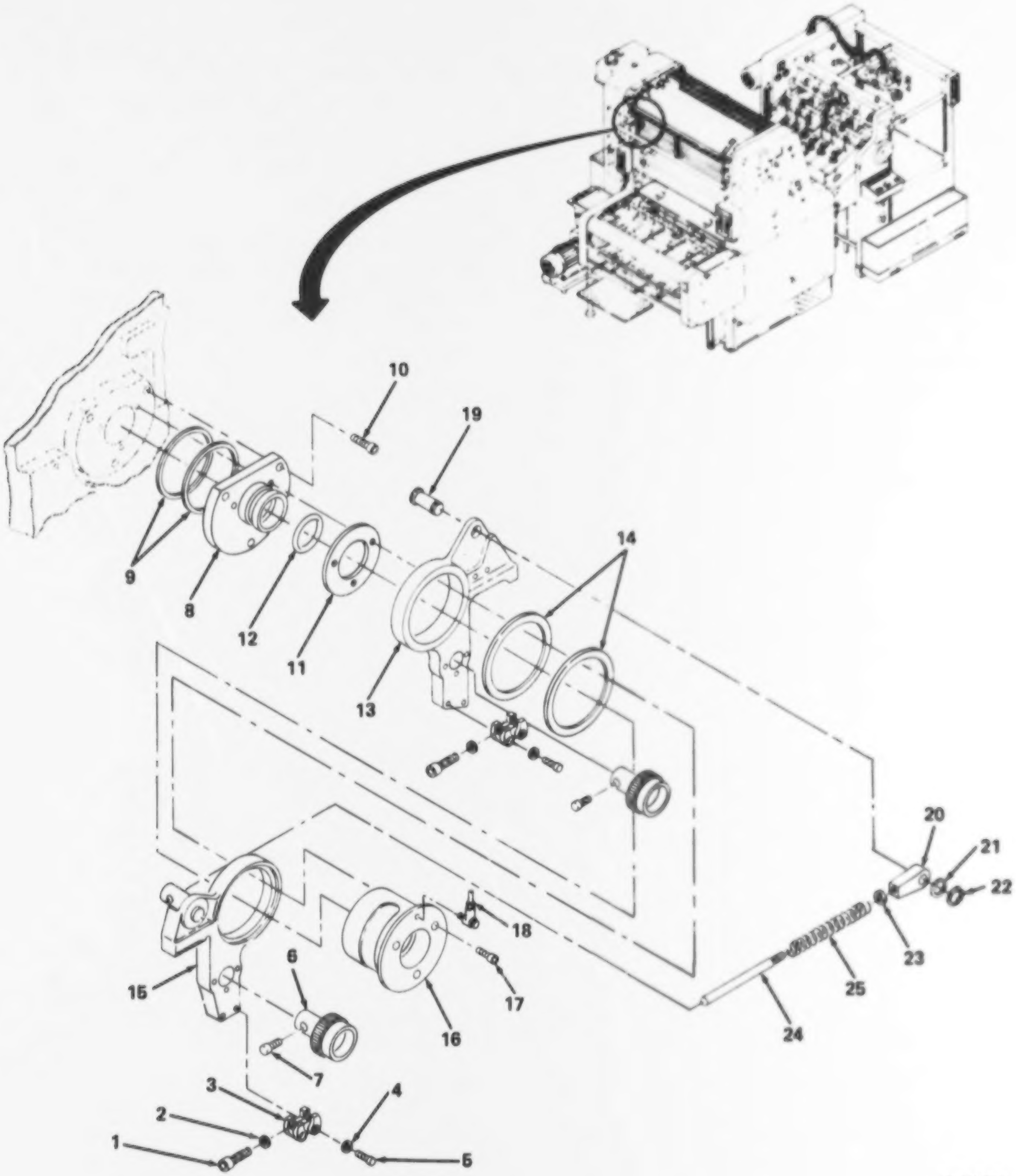
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Figure 2-48A. Journal Box Housing Assembly Installation.

2-29. Driving Mechanism.

This task covers: a. Remove b. Repair c. Install

INITIAL SETUP

Tools	*Equipment Conditions*
Rubber mallet Bushing driver set Ball-peen hammer 8 in. bronze punch 13 mm combination wrench Retaining-ring pliers 5 mm hex key 6 mm hex key	Main guard assembly removed (para. 2-20) Oscillator lever assembly removed (para. 2-26)

---

a. Remove. (figure 2-49)

NOTE

Zero set the printing press before beginning this procedure.

(1) Remove ball bearing (1).

NOTE

Match/mark the positions of the cams before performing step (2).

(2) Remove three socket-head screws (2), washers (3), dampening ductor roller cam (4), and ink ductor roller cam (5).

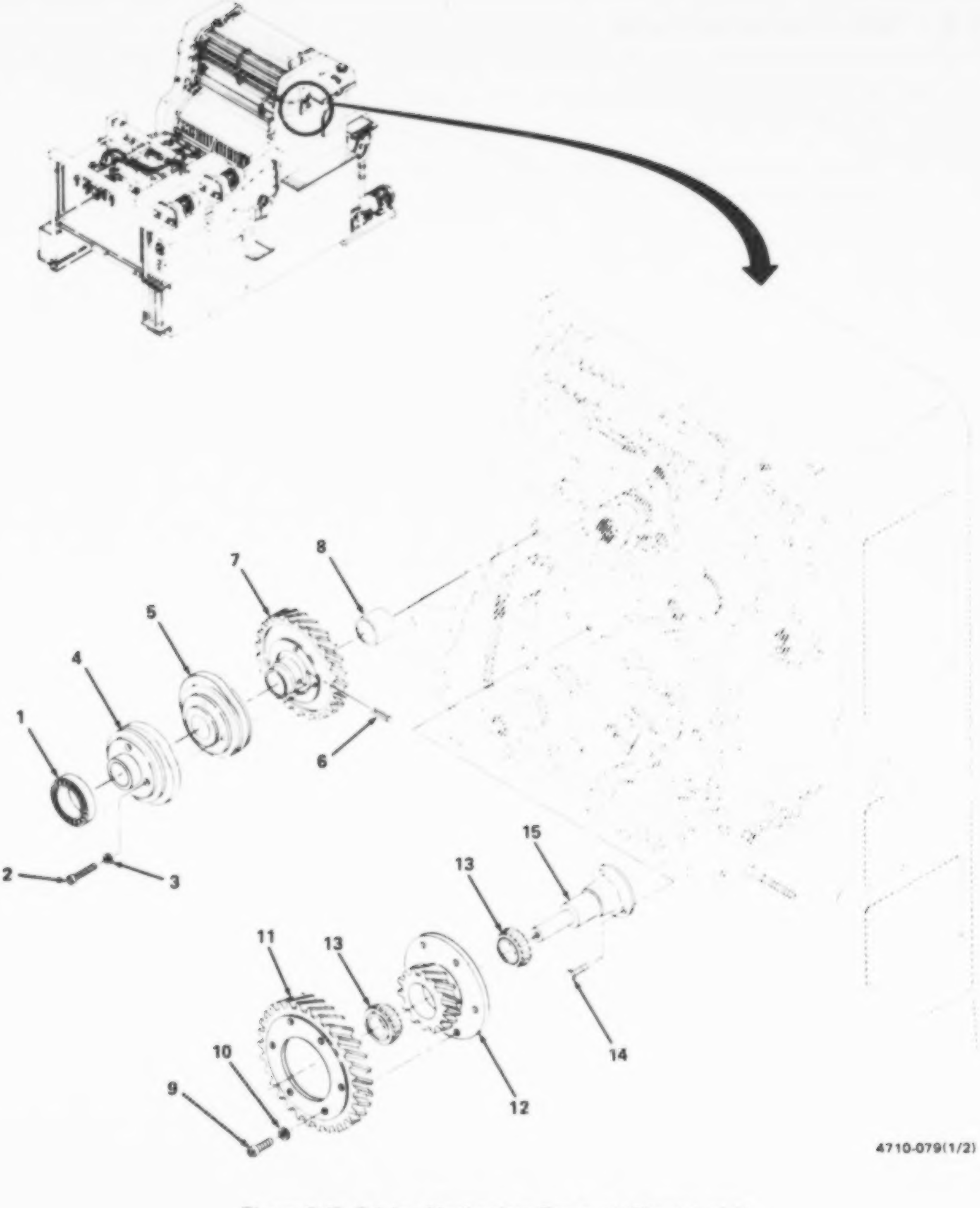
(3) Remove spring tension pin (6), pinion gear (7), and spacer (8).

NOTE

Match/mark the positions of pinion gear (11) to flanged gear (12) before performing step (4).

(4) Remove six socket-head screws (9), washers (10), pinion gear (11), flanged gear (12), and two tapered bearings (13).

(5) Remove three socket-head screws (14) and bearing bolt (15).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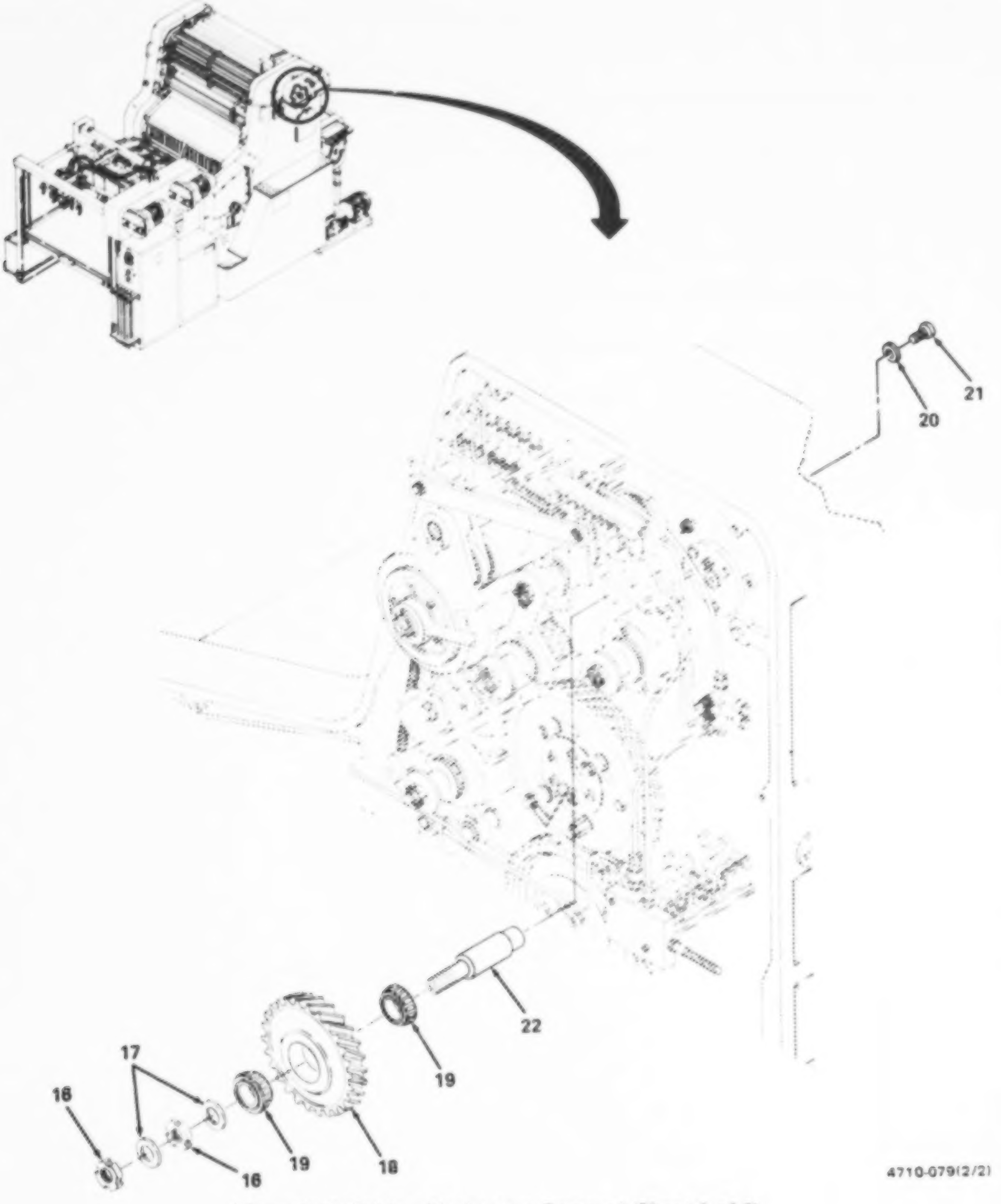
4710-079(1/2)

Figure 2-49. Driving Mechanism Removal (Sheet 1 of 2).

2-29. Driving Mechanism (cont).

(6) Remove two spanner nuts (16, sheet 2)), two washers (17), pinion gear (18) and two tapered bearings (19).

(7) Remove socket-head screw (20) and washer (21) from rear end of bearing bolt (22), and remove bearing bolt (22).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4710-079(2/2)

Figure 2-49. Driving Mechanism Removal (Sheet 2 of 2).

2-29. Driving Mechanism (cont).

b. *Repair.*

(1) Replace frozen or binding ball bearing or tapered bearings.

(2) Replace worn or damaged pinion gears.

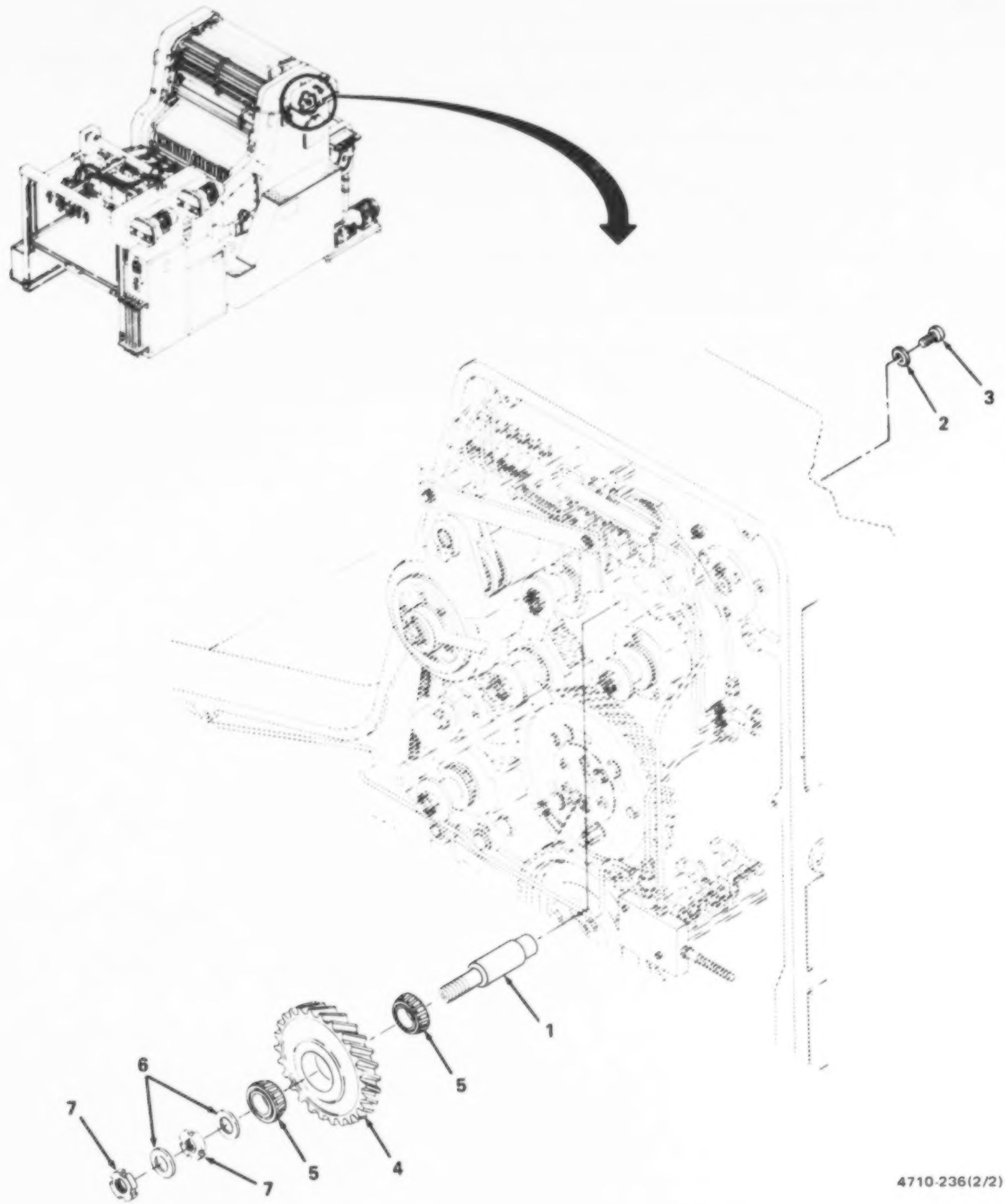
(3) Replace worn cams.

c. *Install.* (figure 2-50)

(1) Install bearing bolt (1), washer (2), and socket-head screw (3).

(2) Install pinion gear (4) with two tapered bearings (5).

(3) Install two washers (6) and spanner nuts (7).



4710-236(2/2)

Figure 2-50. Driving Mechanism Installation (Sheet 1 of 2).

2-29. Driving Mechanism (cont).

(4) Install bearing bolt (8, sheet 2) and three socket-head screws (9).

(5) Install two tapered bearings (10) with flanged gear (11), and pinion gear (12).

(6) Aline marks on flanged gear (11) and pinion gear (12) and install six washers (13) and six socket-head screws (14).

(7) Install spacer (15), pinion gear (16), and spring tension pin (17).

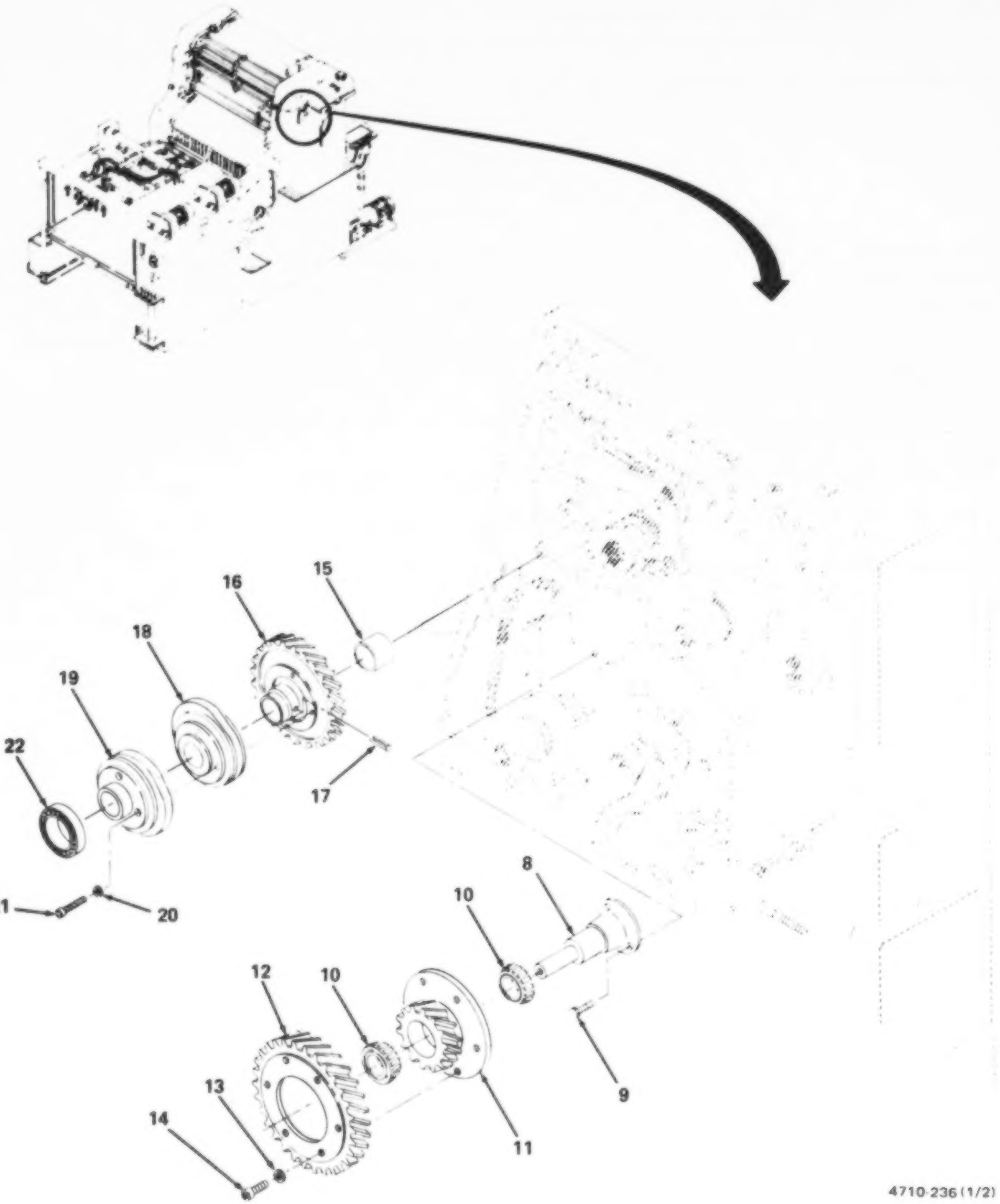
(8) Install ink ductor roller cam (18) and dampening ductor roller cam (19).

(9) Aline marks on ink ductor roller cam (18) and dampening ductor roller cam (19) and install three washers (20) and three socket-head screws (21).

(10) Replace ball bearing (22).

NOTE

FOLLOW-ON MAINTENANCE:
(1) Install oscillator lever assembly (para. 2-26).
(2) Install main guard assembly (para. 2-20).



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4710-236 (1/2)

Figure 2-50. Driving Mechanism Installation (Sheet 2 of 2).

2-30. Vibrator Roller Bearing Assembly.

This task covers: a. Remove b. Repair c. Install

INITIAL SETUP

Tools	*Equipment Conditions*
5 mm pin punch Ball-peen hammer Retaining-ring pliers	Main guard assembly (D/S) removed (para. 2-20) Upper guard and accessories (O/S) removed (para. 2-18)

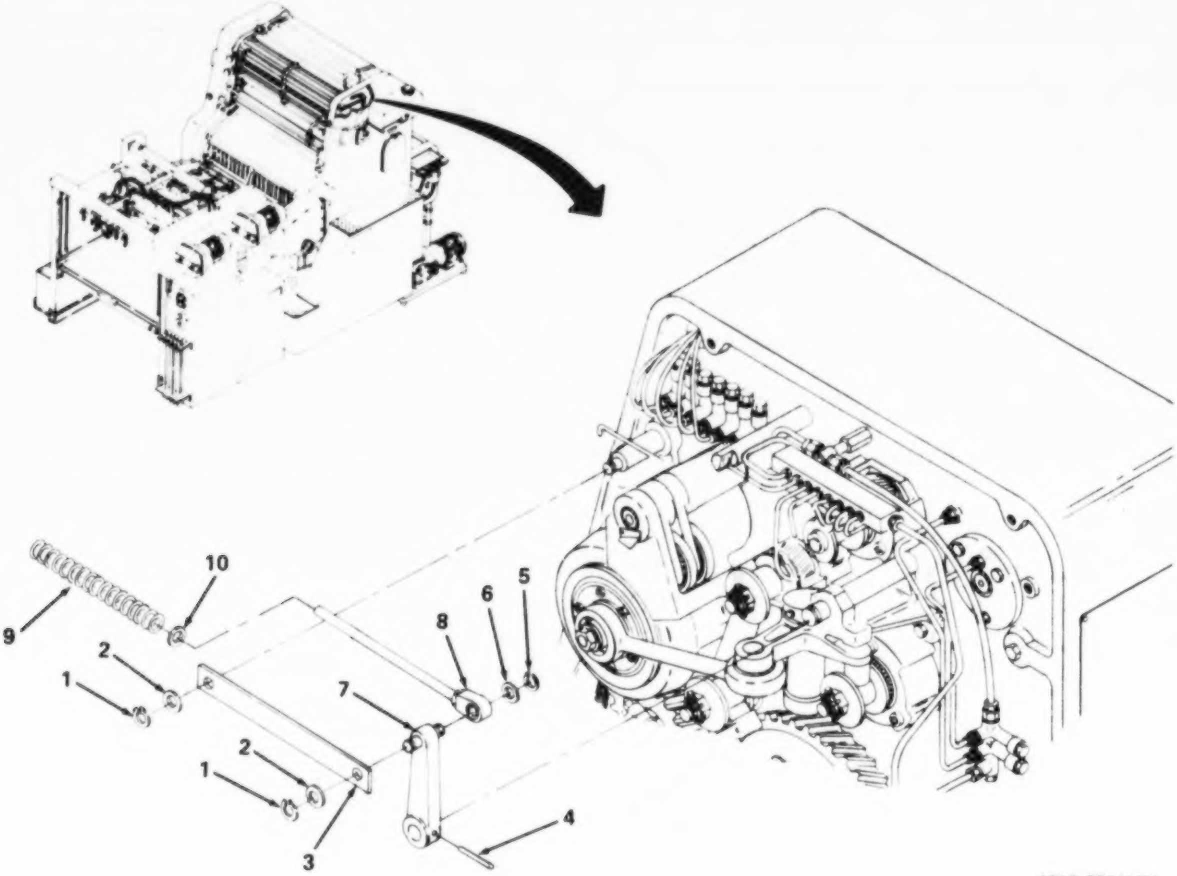
a. Remove.

(1) *Pull rod and spring rod.* (figure 2-51)

(a) Remove two retaining rings (1), two washers (2), and pull rod (3).

(b) Remove tapered pin (4), retaining ring (5), and washer (6).

(c) Remove lever (7), spring rod (8), spring (9), and washer (10).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4710-057(1/2)

Figure 2-51. Pull Rod and Spring Rod Removal.

2-30. Vibrator Roller Bearing Assembly (cont).

(2) *Vibrator bearing assembly.* (figure 2-52)

(a) Loosen lock nut (11) and adjusting screw (12) on both bearing assemblies.

(b) Remove two spring pins (13).

(c) Slide retaining ring (14), washer (15), lever (16), and bearing (17) to D/S side of shaft (18).

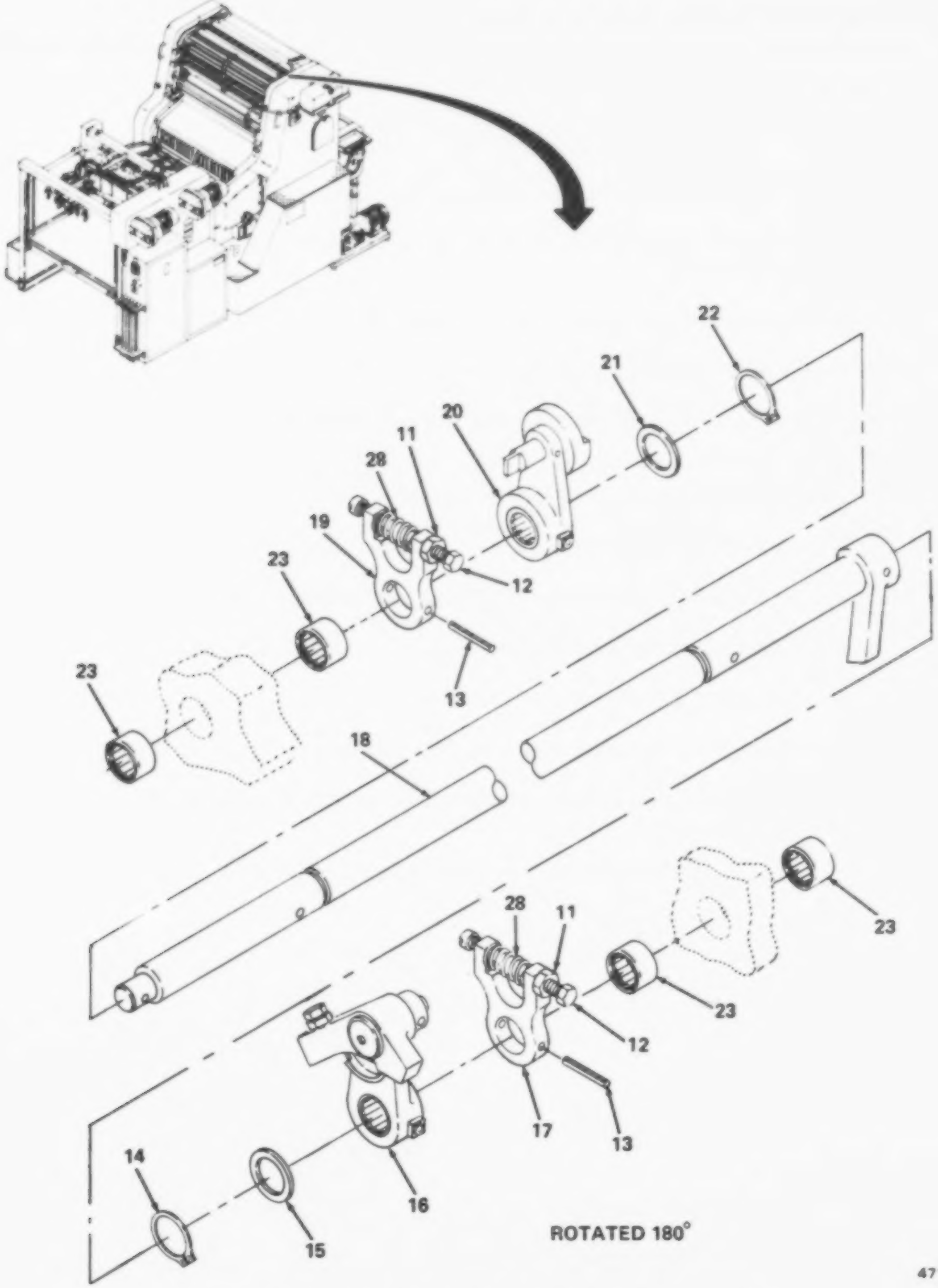
(d) Carefully slide shaft (18) out of O/S of press frame.

(e) Remove bearing (19), lever (20), washer (21), and retaining ring (22) from shaft.

(f) Remove retaining ring (14), washer (15), lever (16), and bearing (17) from shaft.

(g) Remove shaft (18) through O/S side.

(h) Remove four needle bearings (23) from press on O/S and D/S frames.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ROTATED 180°

4710-067(2/2)

Figure 2-52. Vibrator Bearing Assembly Removal.

2-30. Vibrator Roller Bearing Assembly (cont).

b. Repair (figure 2-53)

NOTE

Disassembly of both bearing assemblies is the same.

(1) Remove set screw (1), adjusting screw (2), lock nut (3), washer (4), and spring (5) from bearing assembly (6).

(2) Remove spring pin (7), pin (8), and latch (9) from lever (10).

(3) Remove hex-head screw (11) and lock nut (12) from latch (9).

(4) Remove pin (13), roller bearing (14), and grease fittings (15) from levers (10) and (16).

(5) Remove tapered pin (17) and lever (18) from shaft (19).

(6) Replace broken, cracked, distorted, and excessively worn parts.

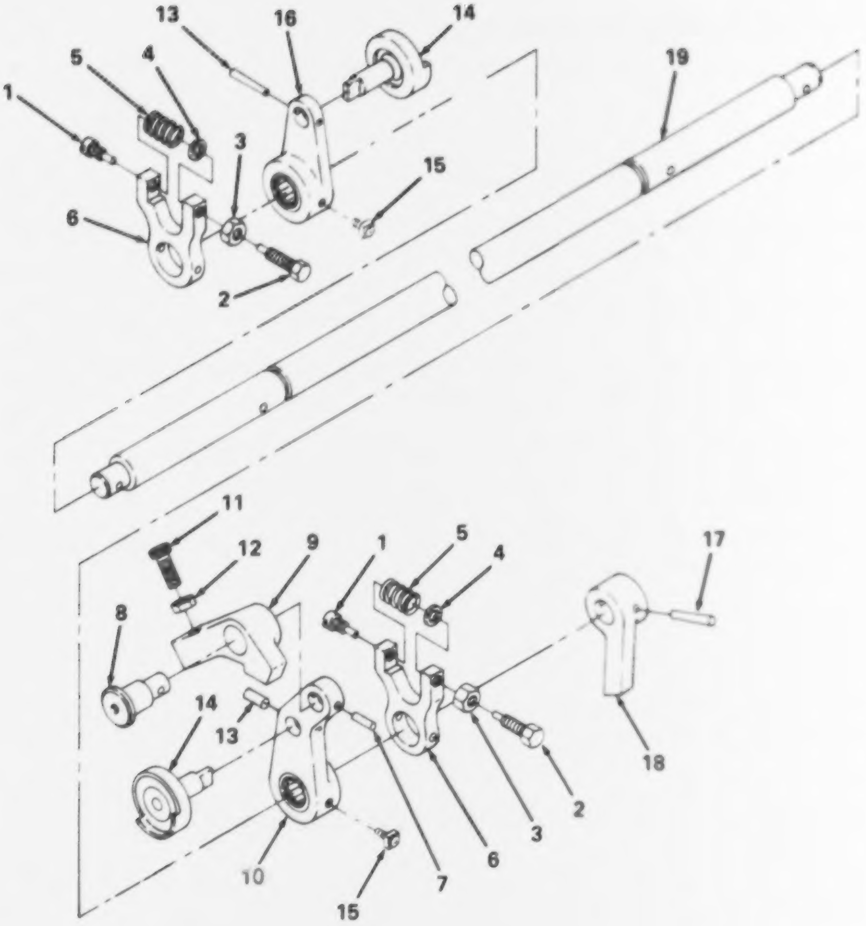
(7) Aline lever (18) on operator end of shaft (19), and replace tapered pin (17).

(8) Replace and aline roller bearing (14) in levers (10) and (16), and replace pins (13).

(9) Replace hex screw (11) and lock nut (12) on latch (9).

(10) Replace pin (8) through latch (9), into lever (10). Replace spring pin (7) in lever (10).

(11) Replace spring (5), washer (4), adjusting screw (2), lock nut (3), and set screw (1) in bearing assembly (6).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4710 058

Figure 2-53. Vibrator Roller and Bearing Assembly Repair.

2-30. Vibrator Roller Bearing Assembly (cont).

c. *Install.*

(1) *Vibrator bearing assembly.* (figure 2-54)

(a) Press four needle bearings (1) into frame. Bearings are pressed flush to frame, one from inside, one from outside, on both the O/S and D/S.

(b) Partially insert shaft (2) through frame from O/S, far enough to install components.

(c) Install bearing assemblies (3), lever (4), washer (5), and retaining ring (6) on shaft (2). Slide components to O/S of shaft.

(d) Install retaining ring (7), washer (8), lever (9), and yoke (10) on D/S. Position retaining ring (7) just beyond retaining ring groove (11) on shaft (2).

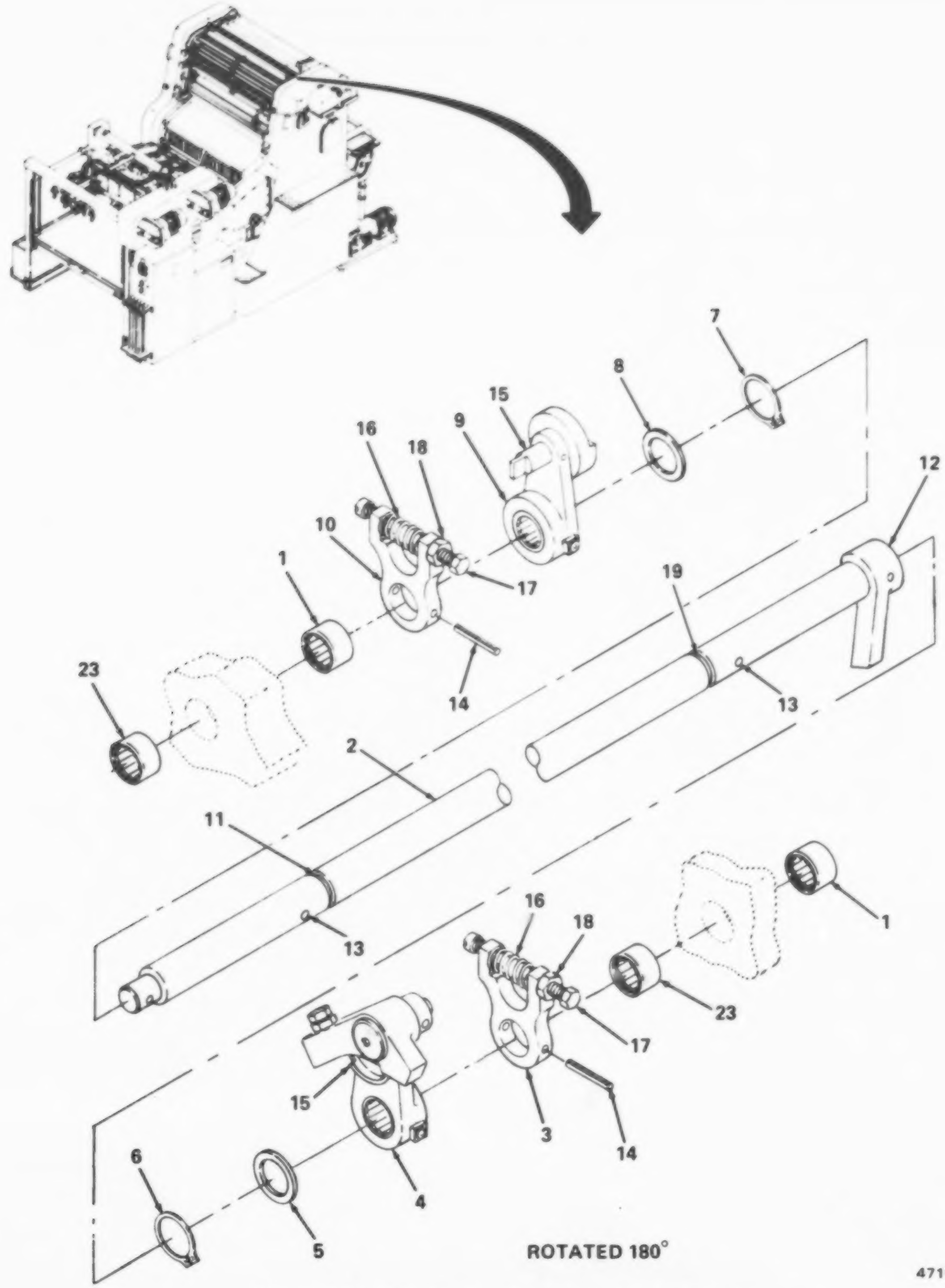
(e) Slide shaft (2) through D/S frame until flush. Lever (12) should be pointing down, and flush against outside of frame on O/S of shaft.

(f) Aline bearing (3) and yoke (10) with holes (13) in shaft (2). Install two spring pins (14).

(g) Position lever (4) next to bearing (3), alining flat tip of roller bearing (15) between spring (16) and adjusting screw (17). Tighten adjusting screw (17) and locking nut (18).

(h) Position washer (5) flush against lever (4). Install retaining ring (6) in ring groove (19).

(i) Repeat steps (f), (g), and (h) for D/S.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4710-224(2/2)

Figure 2-54. Vibrator Bearing Assembly Installation.

2-30. Vibrator Roller Bearing Assembly (cont).

(2) *Pull rod and spring rod.* (figure 2-55)

(a) Install spring rod (1), washer (2), spring (3), lever (4), and tapered pin (5).

(b) Install washer (6) and retaining ring (7).

(c) Install pull rod (8), washer (9), and retaining ring (10).

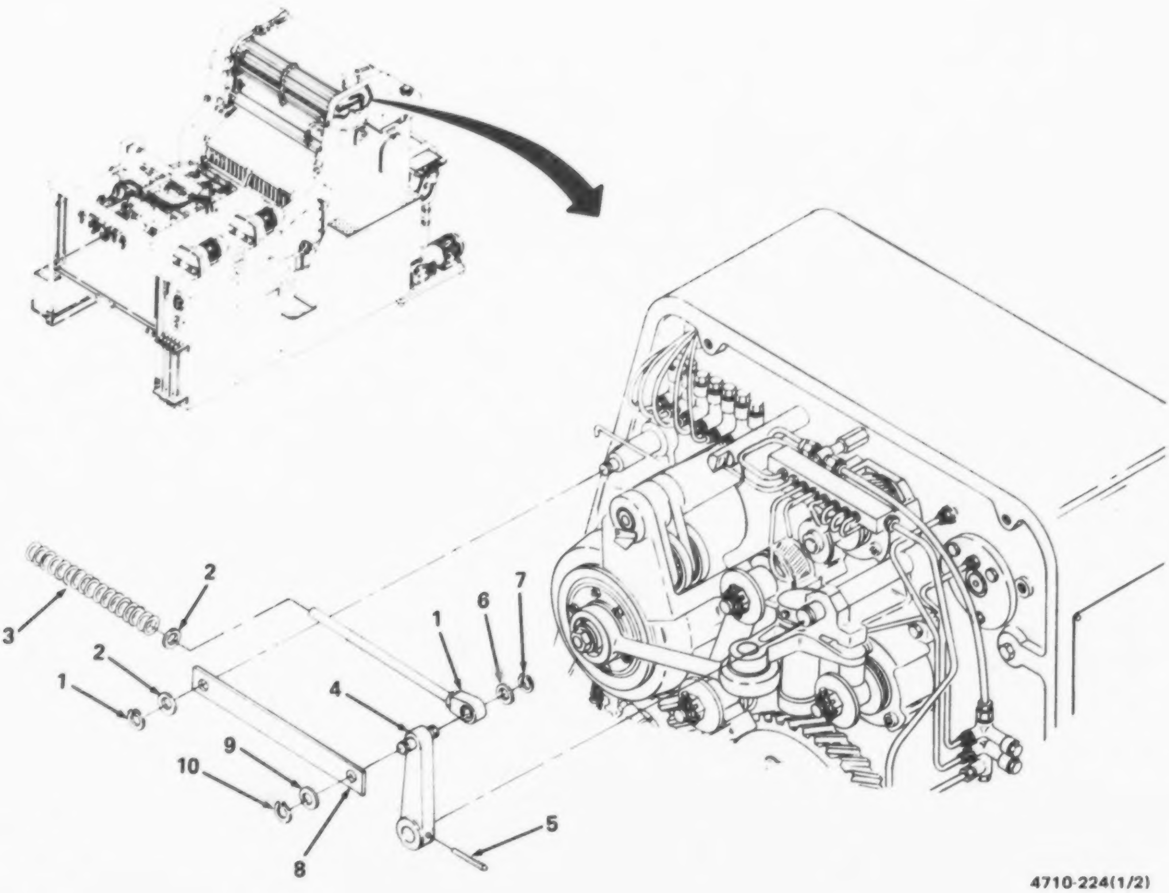


Figure 2-55. Pull Rod and Spring Rod Installation.

NOTE

FOLLOW-ON MAINTENANCE:

(1) Upper guard and accessories (O/S) installed (para. 2-18).

(2) Main guard and accessories (D/S) installed (para. 2-20).

2-31. Roller Adjusters and Feeler Rods.

This task covers: a. Remove b. Repair c. Install d. Aline

INITIAL SETUP

Tools	*Equipment Conditions*
5 mm hex key 10 mm combination wrench 3 mm pin punch Ball-peen hammer	Ink rollers removed (TM 5-3610-286-10) Roller guide rails removed (para. 2-25)

a. Remove. (figure 2-56)

NOTE

- There is a form roller adjuster at the D/S and the O/S end of each of the four form rollers, for a total of eight adjusters. The two pair of adjusters at the delivery end of the press adjust the form rollers closer to the delivery end of the press and the two pair at the feeder end adjust the two form rollers closer to the feeder end of the press. The adjusters are all similar; the upper adjusters being longer then the lower adjusters to reach the upper rollers.
- The following removal procedure covers the two D/S adjusters at the delivery end of the press and is typical of all eight adjusters.

(1) Remove hex-head screws (1) from spring rod guide (2).

NOTE

Roller control rod (4) exists only on the adjuster shown in figure 2-56 and on the upper D/S adjuster at the feeder end of the press, except that rod does not have a bend.

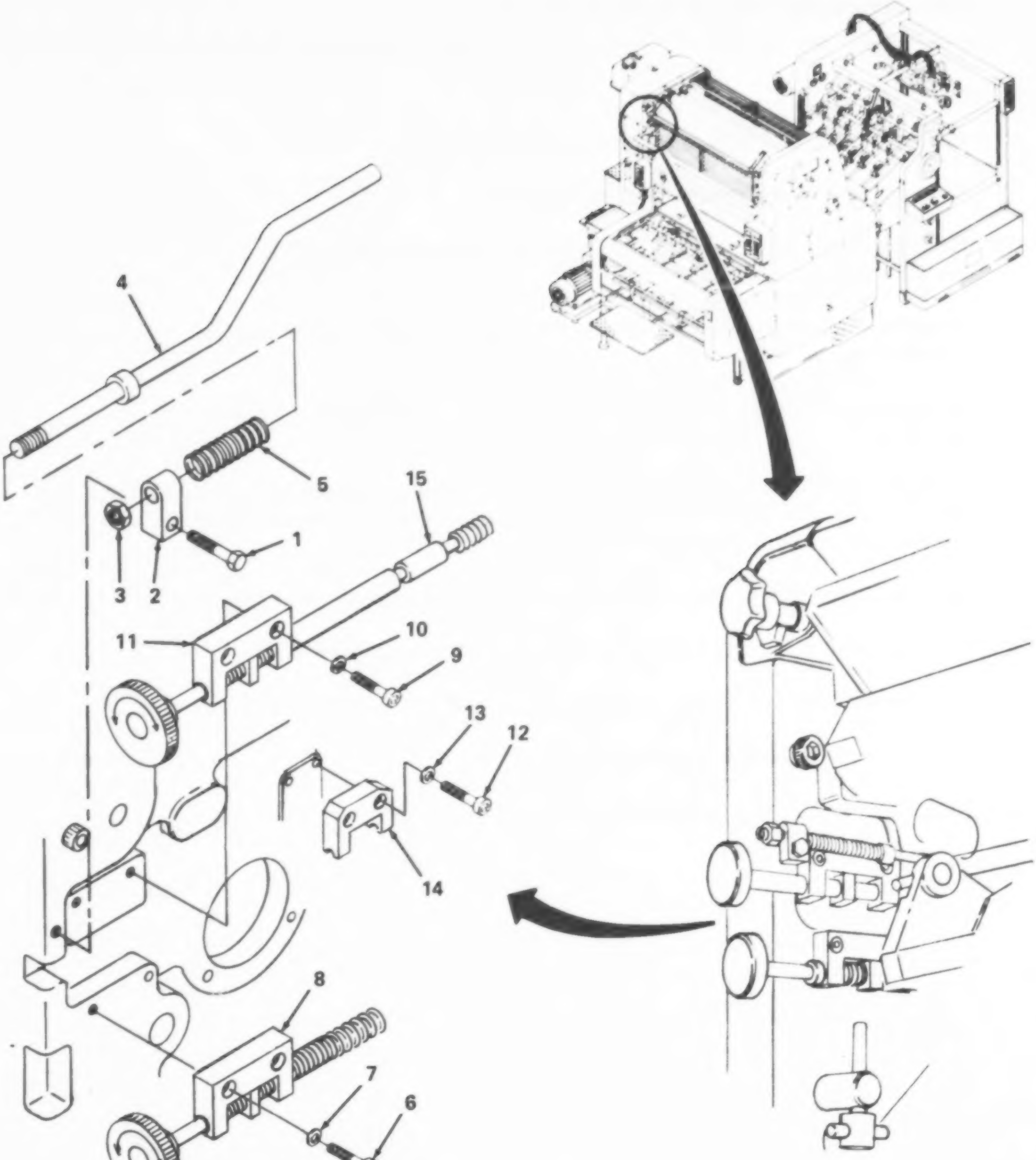
(2) Remove hex nut (3) from roller control rod (4).

(3) Remove roller control rod (4) and compression spring (5).

(4) Remove two socket-head screws (6), two washers (7), and bearing bracket (8).

(5) Remove two socket-head screws (9), two washers (10), and bearing bracket (11).

(6) Remove two socket-head screws (12), two washers (13) and worm gear housing (14).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4710 054

Figure 2-56. Roller Adjusters and Feeler Rods Removal.

2-31. Roller Adjusters and Feeler Rods (cont).

b. Repair. (figure 2-57)

(1) Drive out pin (1) and remove collar (2) from roller control rod (3).

(2) Drive out pins (4) and remove knurled knobs (5).

(3) Unscrew and remove threaded spindle (6) and spacer (7), washer (8) and guide block (9) from bearing bracket (10).

(4) Unscrew and remove threaded spindle (11) and guide block (12) from bearing bracket (13).

(5) Drive out pin (14) and separate worm gear (15) and spacer (16) from threaded spindle (11).

(6) Replace broken or weak compression spring (17), worn or unreadable indicator plate (18), bent or broken roller control rod (3), and worn or binding threaded spindles (3, 11) or worm (15). Replace damaged worm gear housing (19).

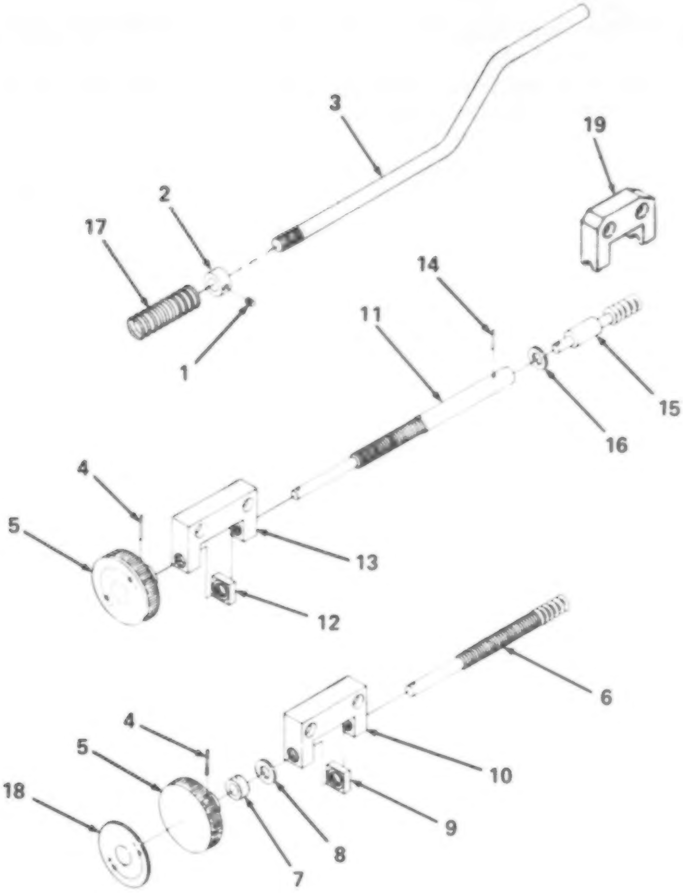
(7) Replace worm (15) and spacer (16) in threaded spindle (11) and insert pin (14).

(8) Replace threaded spindle (11) and guide block (12) in bearing bracket (13).

(9) Replace threaded spindle (6), spacer (7), washers (8), and guide block (9) in bearing bracket (10).

(10) Replace knurled disks (5) and pins (4).

(11) Replace collar (2) and pin (1) on roller control rod (3).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4710 055

Figure 2-57. Roller Adjusters and Feeler Rods Repair.

2-31. Roller Adjusters and Feeler Rods (cont).

c. *Install.* (figure 2-58)

(1) Replace worm gear housing (1), two washers (2), and socket-head screws (3).

(2) Aline worm gear (4) in worm gear housing (1) and replace bearing bracket (5), two washers (6), and two socket-head screws (7).

(3) Install bearing bracket (8), two washers (9), and two socket-head screws (10).

(4) Install compression spring (11), roller control rod (12), and hex nut (13).

(5) Install spring rod (14) and hex-head screw (15).

d. *Aline.* (figure 2-58)

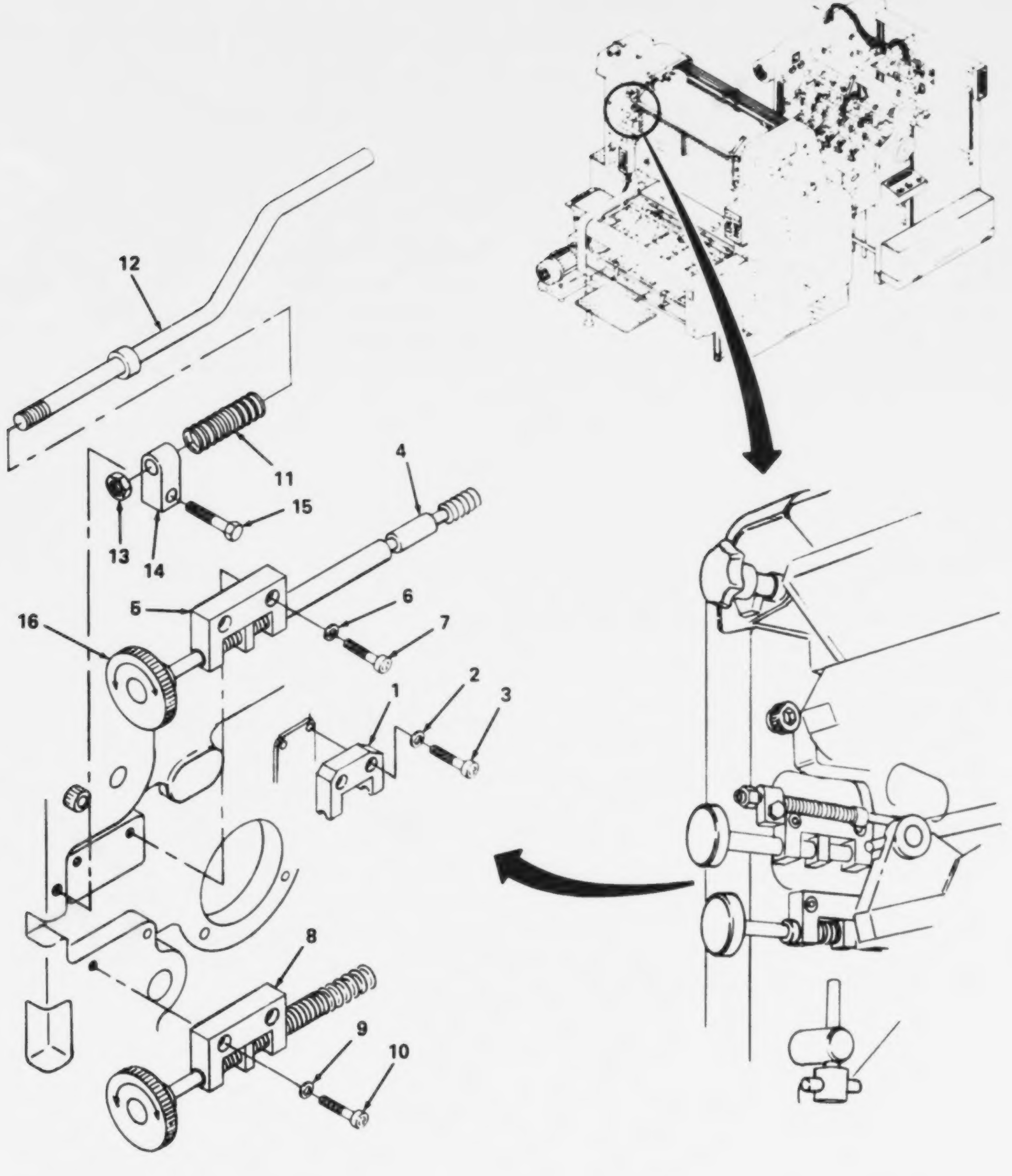
(1) Loosen socket-head screws (7).

(2) Rotate adjuster knob (16) until worm gear (4) seats fully in worm gear housing (1) and turns without binding.

(3) Tighten socket-head screws (7).

NOTE

FOLLOW-ON MAINTENANCE:
(1) Install roller guide rails (para. 2-25).
(2) Install inking rollers (TM 5-3610-286-10).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4710-262

Figure 2-58. Roller Adjustment and Feeler Pads Installation.

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2-32. Ductor Roller Swing Mechanism.

This task covers: a. Remove b. Repair c. Install

INITIAL SETUP

Tools	*Equipment Conditions*
Retaining-ring pliers 5 mm hex key 6 mm hex key 3 mm pin punch 10 mm combination wrench Ball-peen hammer	Main guard and accessories assembly (D/S) removed (para. 2-20) Lubrication and distribution components removed (para. 2-78) Ink fountain assembly removed (para. 2-24)

a. *Remove.* (figure 2-59)

(1) Remove two socket-head cap screws (1) and washers (2).

(2) Remove retaining ring (3), washer (4), and support piece (5) with roller bearing (6).

(3) Remove hex nut (7) washer (8), and bearing bolt (9).

(4) Remove retaining ring (10) and washer (11).

(5) Remove tapered pin (12), pin (13), and pull rod (14) with two needle bearings (15).

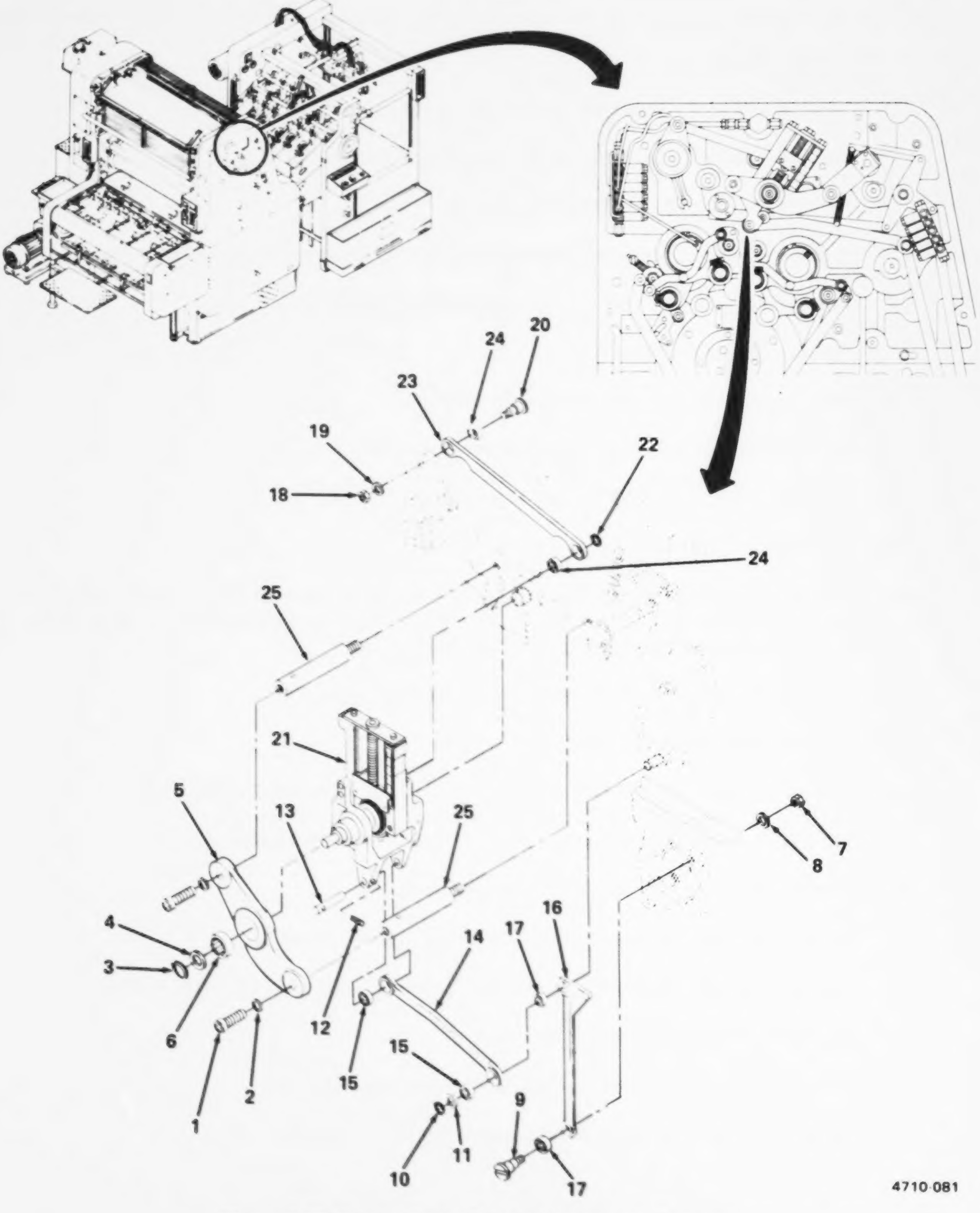
(6) Remove pull rod (16) with two needle bearings (17).

(7) Remove hex nut (18), washer (19), and bearing bolt (20).

(8) Remove swing piece (21).

(9) Remove retaining ring (22) and pull rod (23) with two needle bearings (24).

(10) Remove two supporting bolts (25).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4710-081

Figure 2-59. Ductor Roller Swing Mechanism Removal.

2-32. Ductor Roller Swing Mechanism (cont).

b. *Repair.* (figure 2-60)

(1) Remove two socket-head cap screws (1) and bearing plate (2).

(2) Remove washer (3), set collar (4), hex nut (5), and guide block (6).

(3) Remove two rivets (7) and indicator plate (8).

(4) Remove four socket-head cap screws (9), two pins (10), and two guide pieces (11).

(5) Remove spring tension pin (12), pin (13), and beveled gear (14).

(6) Remove threaded spindle (15).

(7) Remove hex nut (16) and cup spring washer (17).

(8) Remove swing tension pin (18) and beveled gear (19).

(9) Remove bushing (20) from bearing housing (23).

(10) Remove two rivets (21) and pointer (22).

(11) Replace frozen or binding bearings or needle bushings. Replace broken pointer. Replace bevel gears that are worn or have chipped or missing teeth. Replace worn or unreadable indicator plate. Replace deformed cup spring washer.

(12) Replace pointer (22) and two rivets (21) on guide block (6).

(13) Replace bushing (20) in bearing housing (23).

(14) Replace beveled gear (19) and spring tension pin (18) in threaded spindle (15).

(15) Replace cup spring washer (17) and hex nut (16) on threaded spindle (15).

(16) Replace threaded spindle (15) in bearing housing (23).

(17) Replace pin (13), beveled gear (14), and spring tension pin (12).

(18) Replace two pins (10), two guide pieces (11), and four socket-head cap screws (9).

(19) Replace indicator plate (8) and two rivets (7).

(20) Replace guide block (6), hex nut (5), set collar (4) and washer (3).

(21) Replace bearing plate (2) and two socket-head cap screws (1).

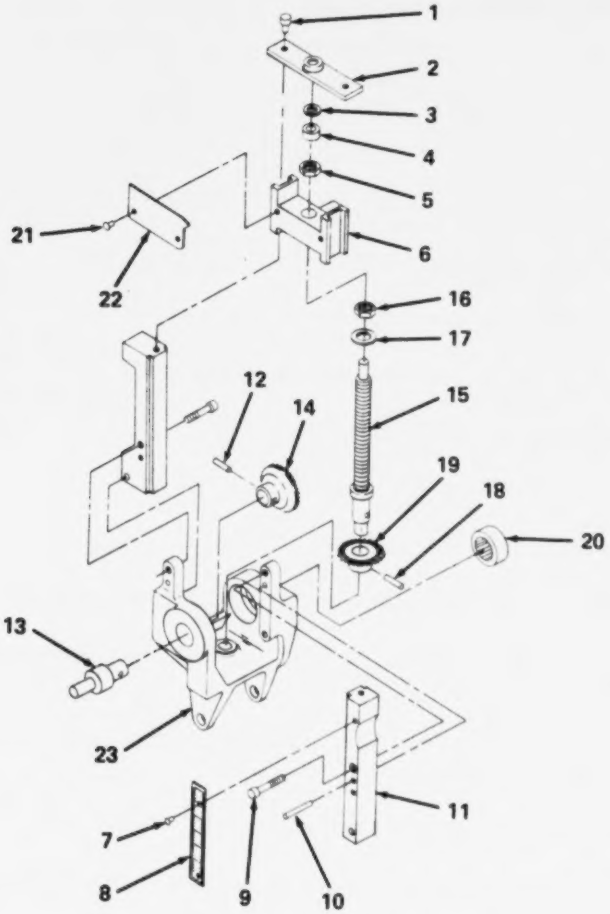
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Figure 2-60. Ductor Roller Swing Mechanism Repair.

2-32. Ductor Roller Swing Mechanism (cont).

c. *Install.* (figure 2-61)

(1) Install two supporting bolts (1).

(2) Install two needle bearings (2) in pull rod (3).

(3) Install pull rod (3) on swing piece (4) and replace retaining ring (5).

(4) Install swing piece (4) on mounting stud (6).

(5) Install bearing bolt (7) in pull rod (3) and replace washer (8) and hex nut (9).

(6) Install two needle bushings (10) in pull rod (11).

(7) Install pull rod (11) on mounting stud (12).

(8) Install needle bearings (13) in pull rod (14).

(9) Install pull rod (14) in swing piece (4) and replace pin (15) and tapered pin (16).

(10) Install other end of pull rod (14) on mounting stud (12) and replace washer (17) and retaining ring (18).

(11) Install bearing bolt (19) through lower end of pull rod (11), and through hole (20) in side wall and install washer (21) and hex nut (22).

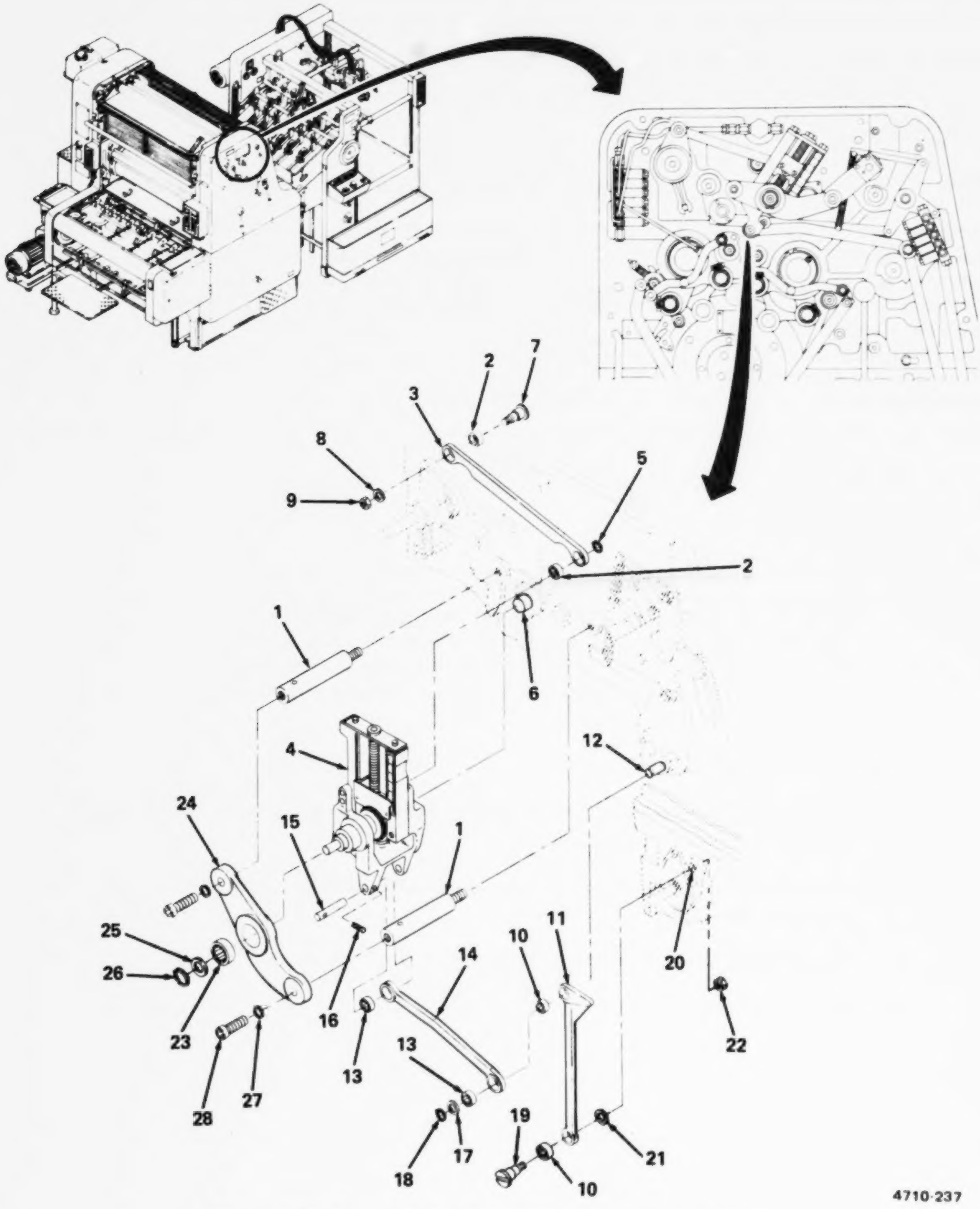
(12) Replace roller bearing (23) in support piece (24).

(13) Replace support piece (24) on swing piece (4) and replace washer (25) and retaining ring (26).

(14) Replace two washers (27) and two socket-head cap screws (28) through support piece (23) into supporting bolts (1).

NOTE

FOLLOW-ON MAINTENANCE:
(1) Install ink fountain assembly (para. 2-24).
(2) Install lubrication distribution components (para. 2-78).
(3) Install main guard and accessories assembly (D/S) (para. 2-20).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4710-237

Figure 2-61. Ductor Roller Swing Mechanism Installation.

2-33. Upper Oscillator Roller and Bearing Assembly.

This task covers: a. Remove b. Repair c. Install

INITIAL SETUP

Tools

Hacksaw
Special wrench
5 mm hex key
6 mm hex key
Ball-peen hammer
4 mm pin punch
19 mm combination wrench
Retaining-ring pliers

Equipment Conditions

Upper guard assembly (O/S) removed (para. 2-18)
Main guard assembly (D/S) removed (para. 2-20)
Oscillator lever assembly removed (para. 2-26)
Inking rollers removed (TM 5-3610-286-10)

a. Remove.

NOTE

Inspect roller journal. If red alinement marks are visible, roller is removed using same procedure as is used to remove lower oscillator rollers. Refer to TM 5-3610-286-10. Remove roller, then proceed directly to paragraph (2) below. If red alinement marks are not visible, roller is a solid, factory-original roller and must be cut to be removed, paragraph (1) below. The original roller is replaced using a kit containing replacement shaft ends as well as a new roller.

(1) *Solid roller.* (figure 4-62)

(a) Support roller (1) with blocks. Place rags (2) under roller shaft ends to prevent metal filings from falling into the press.

(b) Place hacksaw blade (3) in shaft groove (4) located approximately 1 1/2 inch (3.75 cm) from from roller. Cut through shaft.

(c) Repeat step (b) on opposite side of roller.

(d) Remove roller (1).

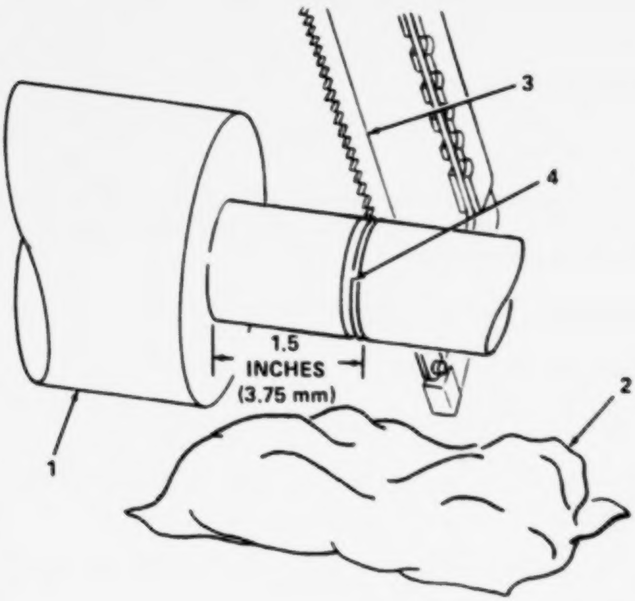
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Figure 2-62. Upper Oscillator Roller Removal.

2-33. Upper Oscillator Roller and Bearing Assembly (cont).

(2) Bearing assembly. (figure 2-63)

NOTE

If a factory-original roller was removed by cutting (paragraph a above), the shaft referred to in the following step is one of the sawed ends remaining in place when the roller is removed.

(a) Remove retaining ring (1) and shaft (2).

(b) Remove three hex-head screws (3) and washers (4).

(c) Remove flange (5), bushing (6), and two seals (7).

(d) On D/S of press, remove spring tension pin (8), castellated nut (9), two collars (10), and spacer (11).

(e) Remove three socket-head screws (12), two washers (13), and bearing housing (14).

(f) Remove two roller bearings (15) and gear (16).

(g) Remove three small bearings (17), roll pin (18), and solid pin (19) from shaft (20).

NOTE

If a factory-original roller was removed by cutting (paragraph a above), the shaft referred to in the following step is one of the sawed ends remaining in place when the roller is removed.

(h) Remove shaft (20).

(i) Remove three screws (21) and washers (22).

(j) Remove flange (23), bushing (24), and two seals (25).

NOTE

If original equipment roller was removed from press as in paragraph a above, save two small bearings (17) for installation on new shaft.

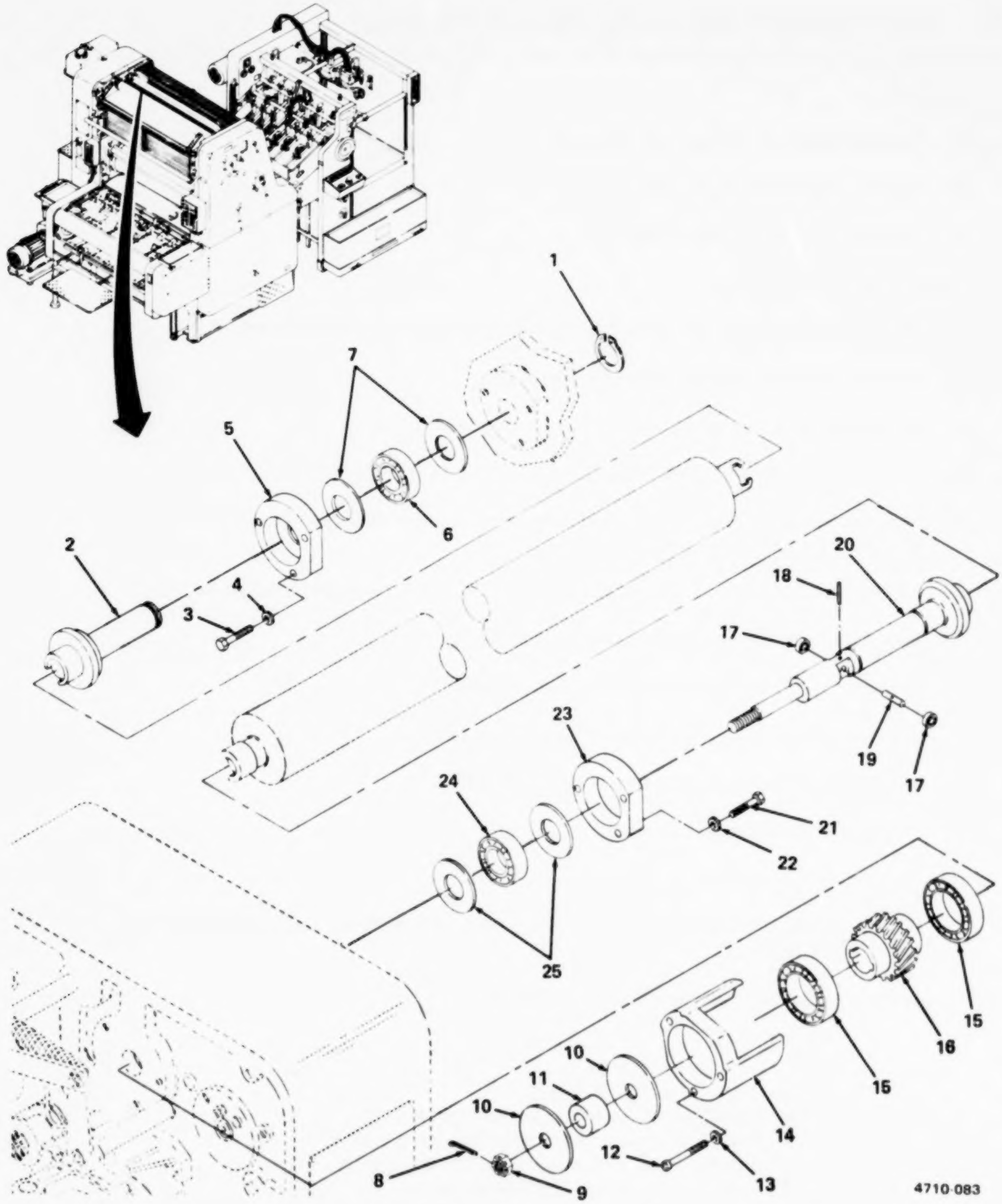
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Figure 2-63. Upper Oscillator Roller and Bearing Assembly Removal.

2-33. Upper Oscillator Roller and Bearing Assembly (cont).

b. Repair.

(1) Replace frozen or binding roller bearings.

(2) Replace worn or damaged gear.

(3) Replace damaged or leaking seals.

c. Install. (figure 2-64)

(1) Install solid pin (1) and two small bearings (2) on shaft (3) and install roll pin (4).

(2) Install bushing (5) and two seals (6) in flange (7).

(3) Install shaft (3) in flange (7).

(4) Install washers (8) and three screws (9).

(5) Line up slot in gear (10) with bearings (2) on shaft (3) and install gear (10) with roller bearings (11).

(6) Install bearing housing (12) and three washers (13), and three socket-head screws (14).

(7) Replace spacer (15) and two collars (16) on shaft (3).

(8) Replace castellated nut (17) and spring tension pin (18).

(9) Install roller bearing (19) and two seals (20) in flange (21).

(10) Install flange (21), three washers (22), and screws (23).

(11) Install shaft (24) through flange (21).

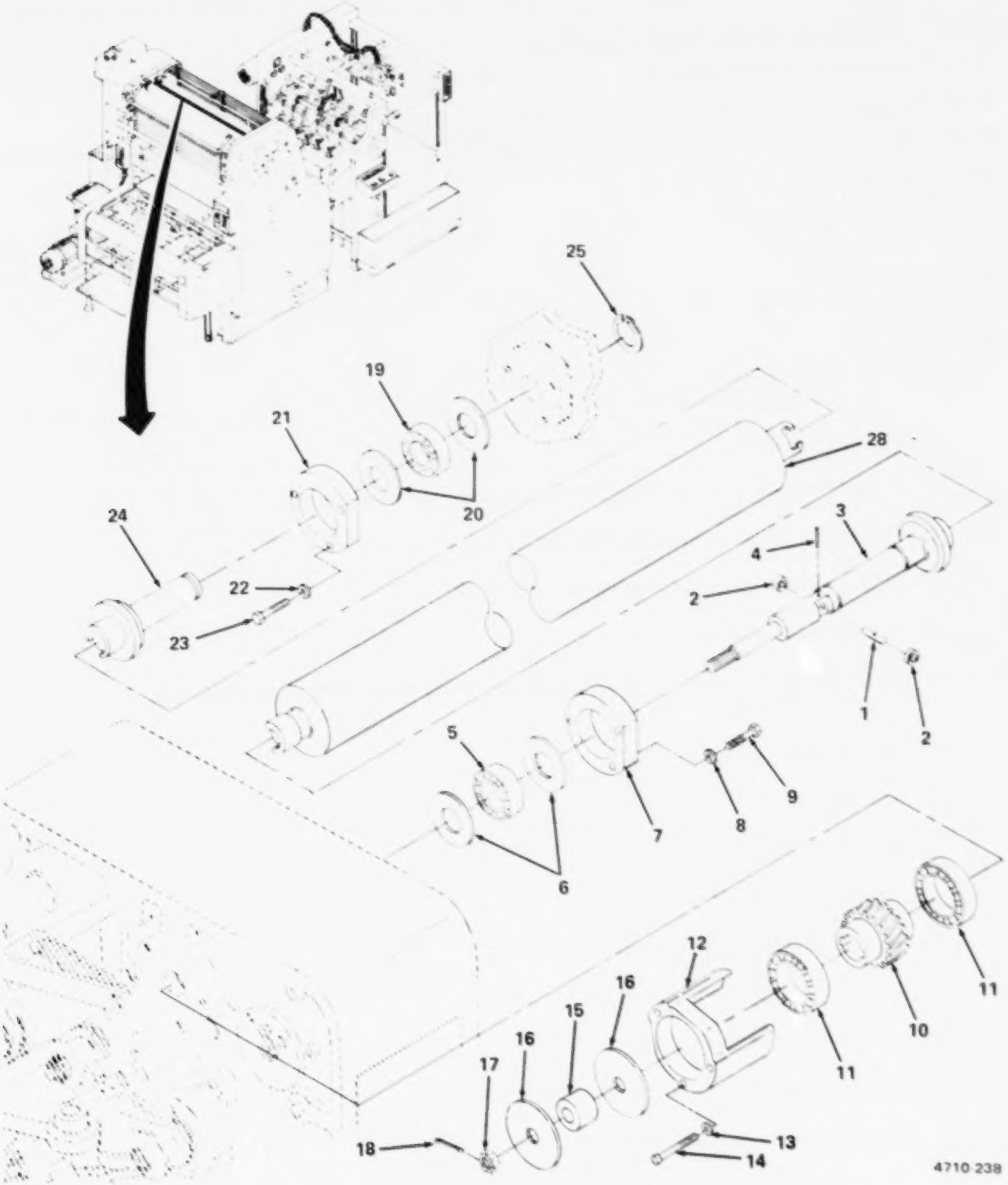
(12) Install retaining ring (25).

(13) Rotate both replacement shafts so that red marks are horizontal, facing the delivery end with cradles facing up.

(14) Install replacement roller (28) (TM 5-3610-286-10).

NOTE

FOLLOW-ON MAINTENANCE:
(1) Install oscillator lever assembly (para. 2-26).
(2) Install main guard assembly (D/S) (para. 2-20).
(3) Install upper guard assembly (O/S) (para. 2-18).
(4) Install inking rollers (TM 5-3610-286-10).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4710-238

Figure 2-64. Upper Oscillator Roller and Bearing Assembly installation.

2-34. Distributor Roller Latch Assembly.

This task covers: a. Remove b. Repair c. Install

INITIAL SETUP

Tools

Retaining-ring pliers
0.050 x 0.375 x 8 in. flat-tip screwdriver
3 mm punch pin
8 mm punch pin
10 mm combination wrench

Equipment Conditions

Distributor roller No. 16 removed
(TM 5-3610-286-10)

---

a. Remove. (figure 2-65)

(1) Pull latch (1) towards feeder end of press and remove set screw (2).

(2) Release latch and remove compression spring (3).

(3) Remove retaining ring (4), washer (5), and latch (1).

(4) Loosen nut (6) and remove spring rod (7).

(5) Remove one short socket-head screw (8), long socket-head screw (9), two washers (10), and guide piece (11).

(6) Remove spring rod guide (12).

(7) Remove pin (13).

b. Repair. (figure 2-65)

(1) Remove pin (14) and rod head (15).

(2) Replace worn or stripped thread rod head.

(3) Replace rod head (15) and pin (14) in latch (1).

(4) Replace worn or broken latch (1).

(5) Replace weak or broken compression spring (3).

(6) Replace broken or missing set screw (2).

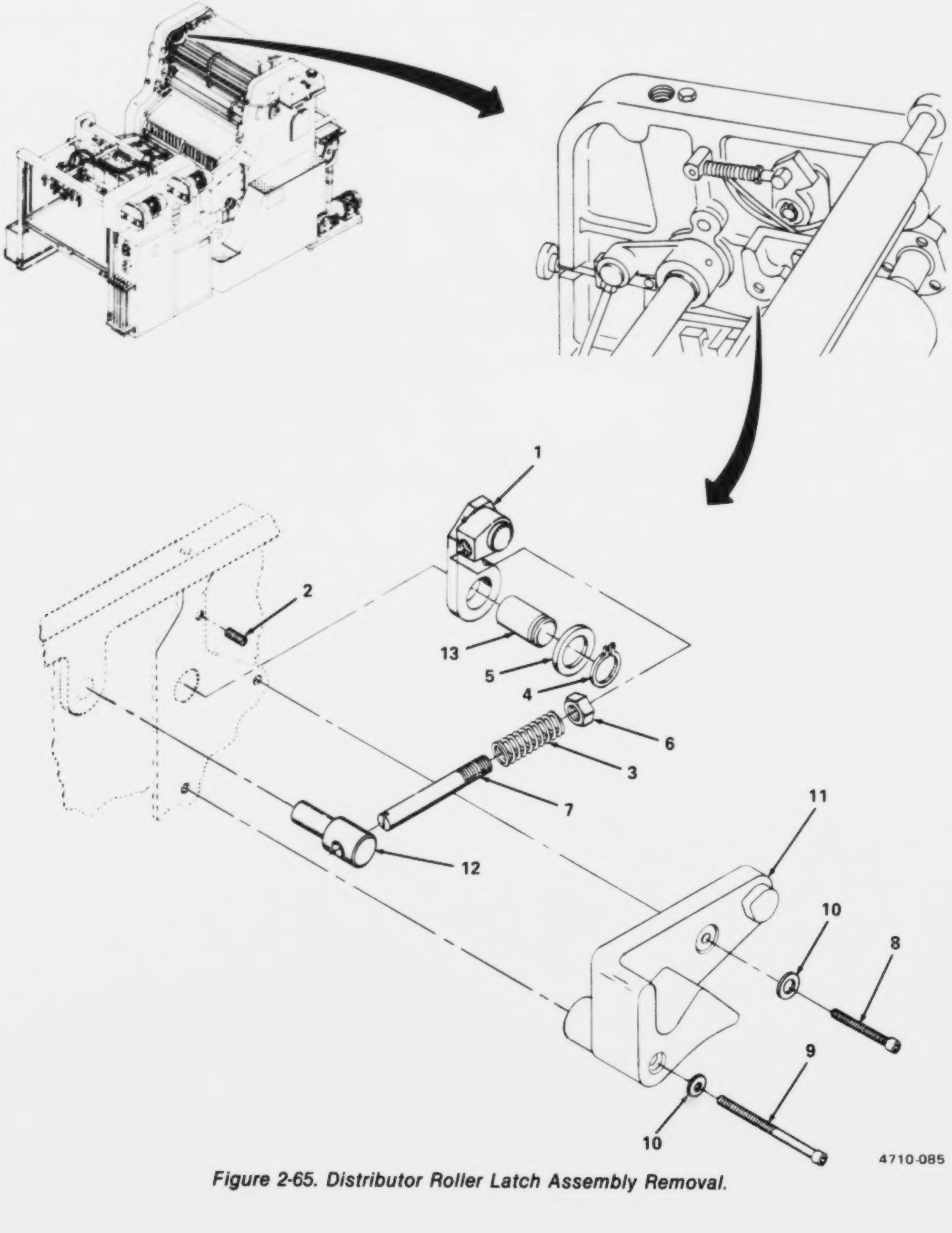
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Figure 2-65. Distributor Roller Latch Assembly Removal.

2-34. Distributor Roller Assembly (cont).

c. *Install.* (figure 2-66)

(1) Install pin (1).

(2) Install spring rod guide (2).

(3) Install guide piece (3), two washers (4), one long socket-head screw (5), and one short socket-head screw (6).

(4) Install latch (7) on pin (1) and replace washer (8) and retaining ring (9).

(5) Install hex nut (10), compression spring (11), and spring rod (12).

(6) Pull latch (7) toward feeder end of press and install set screw (13).

NOTE

FOLLOW-ON MAINTENANCE:
Install distributor roller No. 16 (TM 5-3610-286-10).

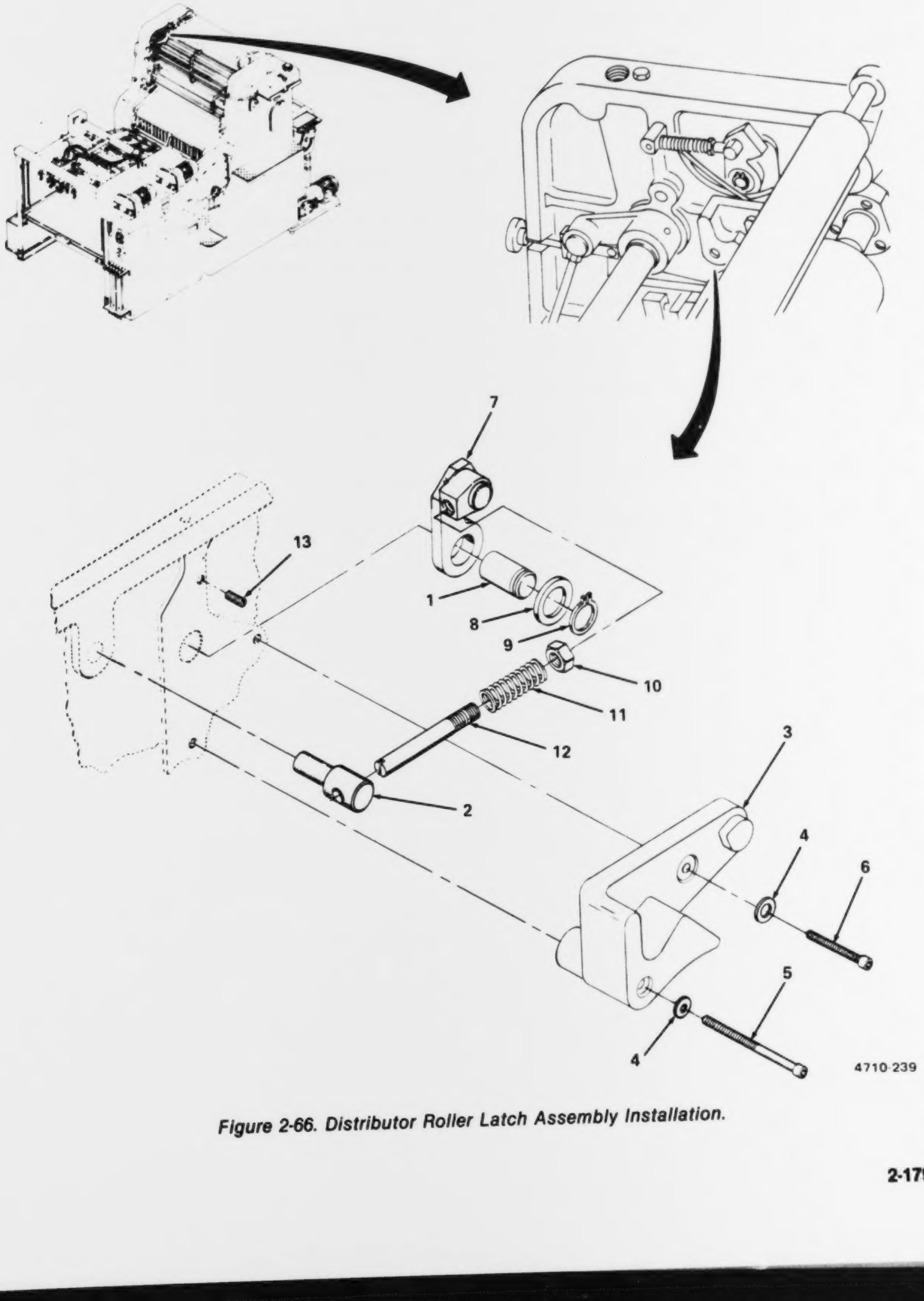
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Figure 2-66. Distributor Roller Latch Assembly Installation.

2-35. Vibrator Roller and Bearing Assembly.

This task covers: a. Remove b. Repair c. Install

INITIAL SETUP

Tools	*Equipment Conditions*
Ball-peen hammer 4 mm pin punch 13 mm combination wrench Retaining-ring pliers	Dampening fountain roller and dampening ductor roller removed (TM 5-3610-286-10) Dampening fountain assembly removed (para. 2-37)

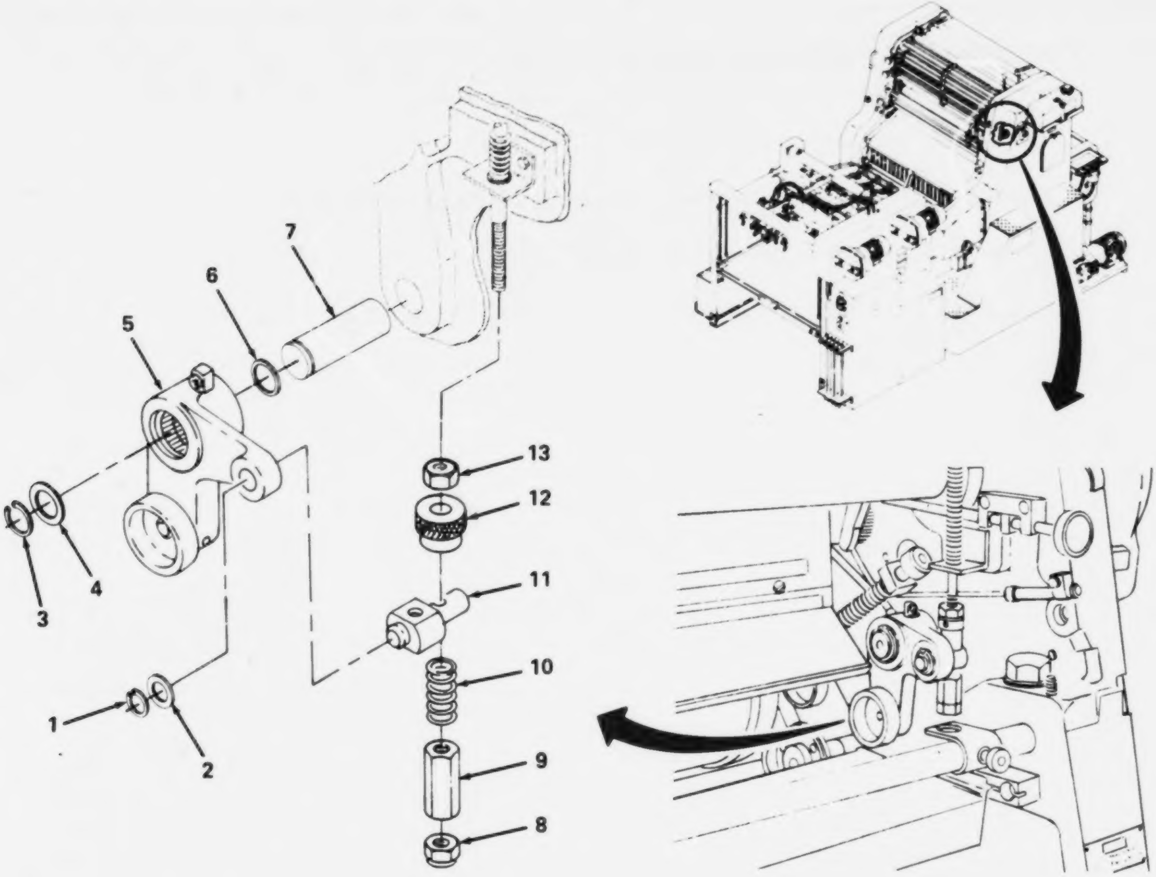
a. *Remove.*

(1) *Vibrator roller and bearing assembly (D/S).* (figure 2-67)

(a) Remove retaining ring (1), washer (2), retaining ring (3), and disk washer (4).

(b) Remove D/S vibrator roller lever (5), seal (6), and pin (7).

(c) Remove hex nut (8), hex spacer (9), spring (10), pin (11), knurled collar (12), and hex nut (13).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4710-087(1/2)

Figure 2-67. Vibrator Roller and Bearing Assembly Removal (D/S).

2-35. Vibrator Roller and Bearing Assembly (cont).

(2) *Vibrator roller and bearing assembly (O/S).* (figure 2-68)

(a) Remove retaining ring (1), washer (2), retaining ring (3), and disk washer (4).

(b) Remove O/S vibrator roller lever (5), seal (6), and pin (7).

(c) Remove hex nut (8), hex spacer (9), spring (10), pin (11), knurled collar (12), and hex nut (13).

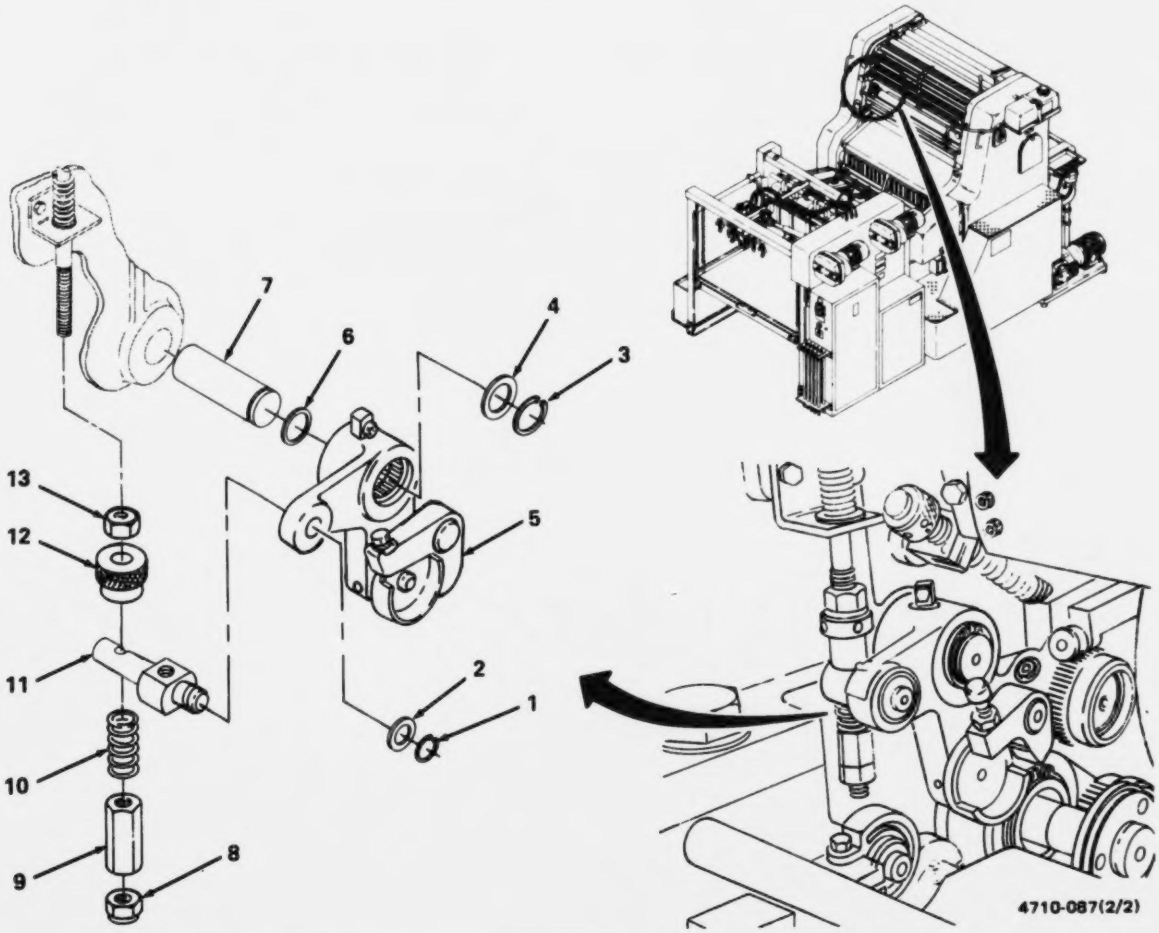

Figure 2-68. Vibrator Roller and Bearing Assembly Removal (O/S).

b. *Repair.* (figure 2-69)

(1) Remove washer (1) and needle bushings (2) and replace frozen bushings.

(2) Remove spring tension pin (3) and roller box (4) and replace damaged box.

(3) Remove grease fittings (5) and replace damaged fitting.

NOTE

Steps (4) through (7) are performed on O/S vibrator roller lever only.

(4) Remove spring tension pin (6), pin (7), collar (8), latch (9) and replace worn latch.

(5) Remove hex bolt (10) and lock nut (11).

(6) Replace hex bolt (10) and lock nut (11).

(7) Replace latch (9), collar (8), pin (7), and spring tension pin (6).

(8) Replace grease fitting (5).

(9) Replace roller box (4) and spring tension pin (3).

(10) Replace needle bushings (2) and washer (1).

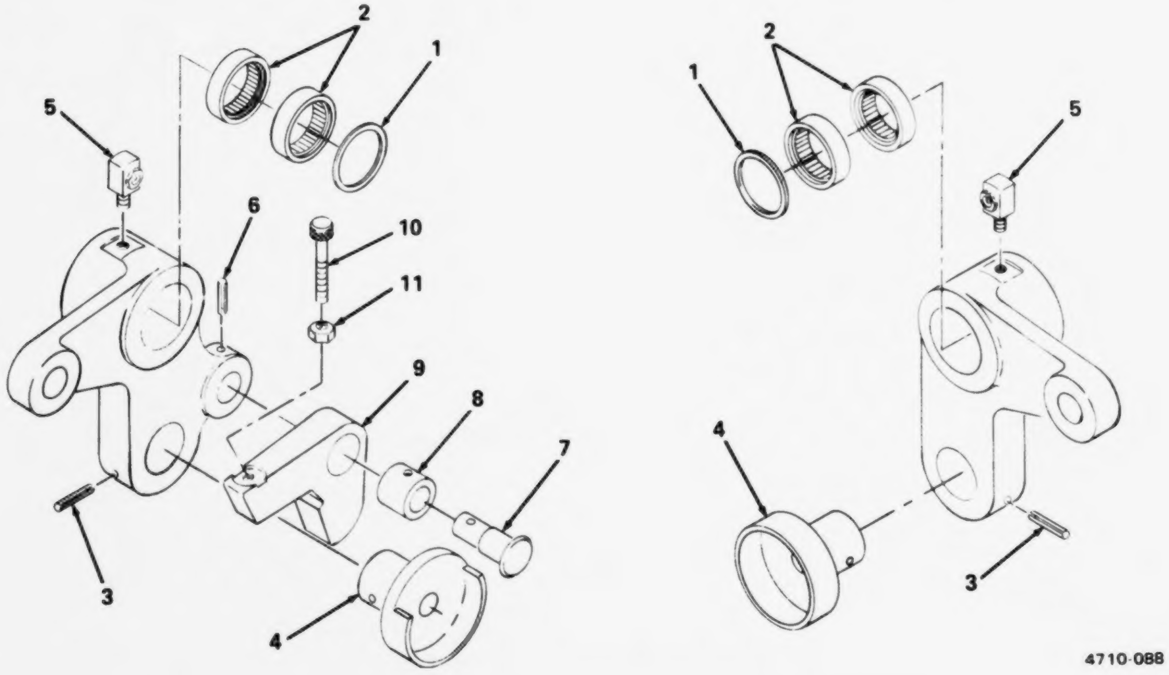

Figure 2-69. Vibrator Roller and Bearing Assembly Repair.

2-35. Vibrator Roller and Bearing Assembly (cont).

c. *Install.*

(1) *Vibrator roller and bearing assembly (O/S).* (figure 2-70)

(a) Install hex nut (1), knurled collar (2), pin (3), spring (4), hex spacer (5), and hex nut (6).

(b) Install pin (7), seal (8), and O/S vibrator roller lever (9).

(c) Install disk washer (10), retaining ring (11), washer (12), and retaining ring (13).

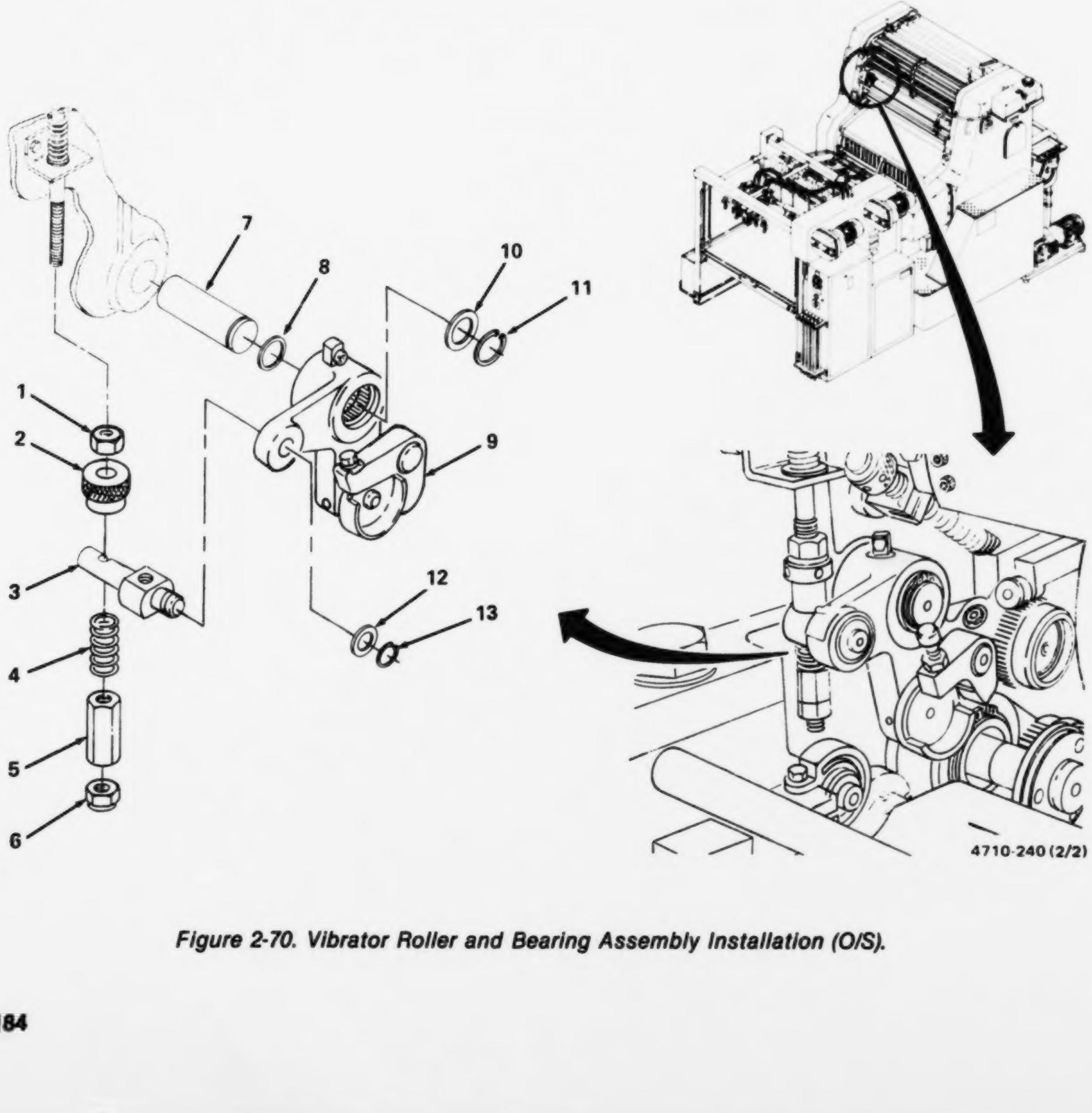

Figure 2-70. Vibrator Roller and Bearing Assembly Installation (O/S).

(2) *Vibrator roller and bearing assembly (D/S).* (figure 2-71)

(a) Replace hex nut (1), knurled collar (2), pin (3), spring (4), hex spacer (5), and hex nut (6).

(b) Replace pin (7), seal (8), and D/S vibrator roller lever (9).

(e) Replace disk washer (10), retaining ring (11), washer (12), and retaining ring (13).

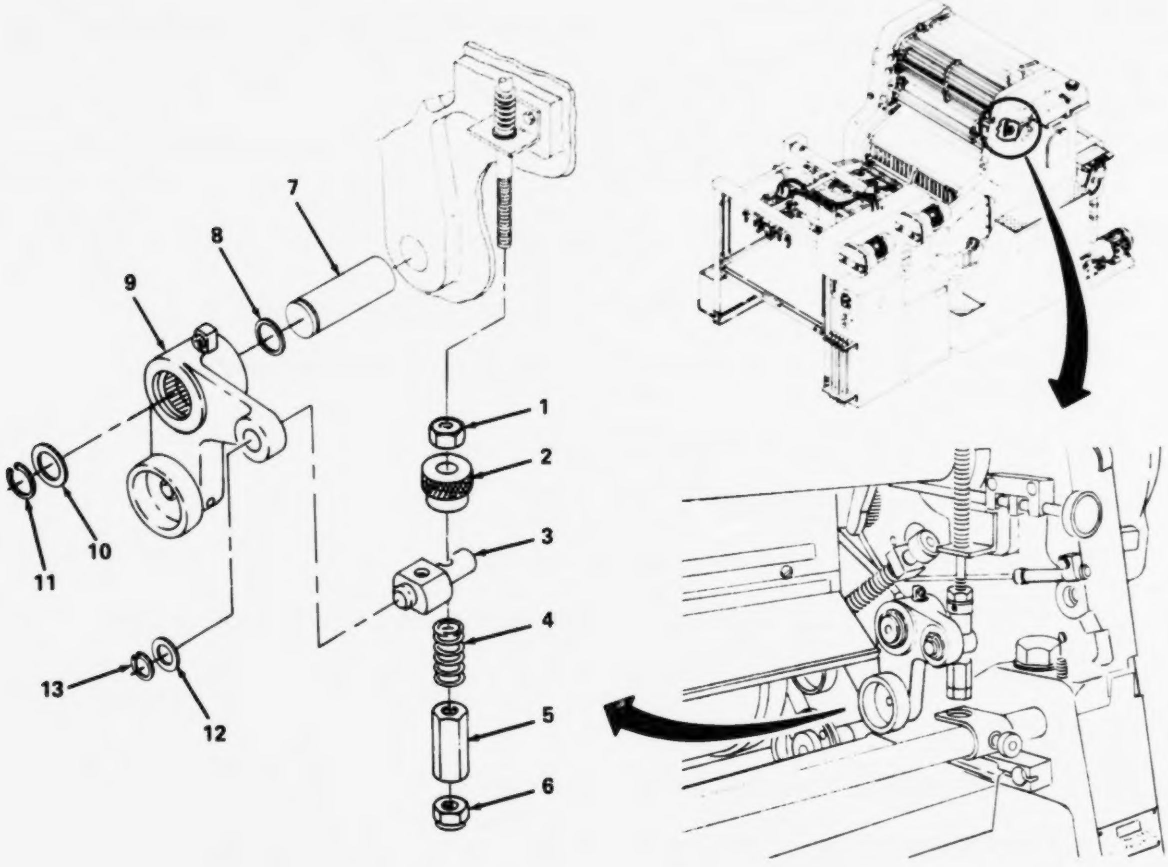

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Figure 2-71. Vibrator Roller and Bearing Assembly Installation (D/S).

NOTE

FOLLOW-ON MAINTENANCE:
(1) Install dampening fountain assembly (para. 2-37).
(2) Install dampening fountain and ductor rollers (TM 5-3610-286-10).

2-36. Engaging Lever Assembly.

This task covers: a. Remove b. Repair c. Install d. Adjust

INITIAL SETUP

Tools	*Equipment Condition*
Retaining-ring pliers Ball-peen hammer 4 mm pin punch 13 mm combination wrench	Main guard assembly (D/S) removed (para. 2-20)

a. *Remove.* (figure 2-72)

WARNING

Compression spring is under pressure. Use care in removal step (1).

(1) Loosen hex-lock nut (1) and unscrew and remove spring rod (2), compression spring (3), and washer (4).

(2) Loosen hex-lock nut (5) and unscrew and remove block (6).

(3) Remove spring tension pin (7).

(4) Remove pin (8), rod head (9) and needle bushing (10).

(5) Remove retaining ring (11), washer spacer (12), lever (13), and needle bushing (14).

(6) Remove hex-head cap screw (15) washer (16), and remove stud (17).

b. *Repair.*(figure 2-72)

(1) Replace binding or frozen needle bushings (10, 14)

(2) Replace weak or broken compression spring (3).

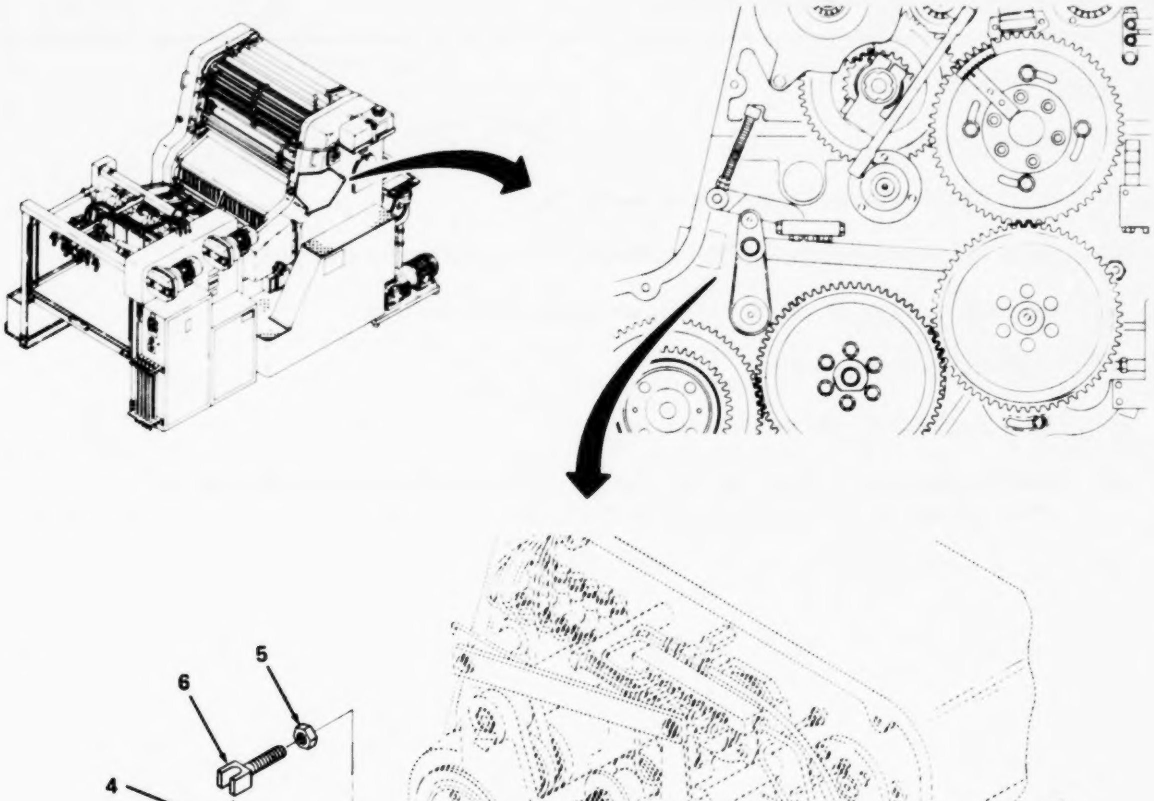
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Figure 2-72. Engaging Lever Removal.

2-36. Engaging Lever Assembly (cont).

c. *Install.* (figure 2-73).

(1) Install stud (1).

(2) Install washer (2) and hex-head cap screw (3).

(3) Install needle bushing (4), lever (5), washer spacer (6), and retaining ring (7).

(4) Assemble rod head (8), needle bushing (9), and pin (10) in lever (5).

(5) Install spring tension pin (11).

(6) Install block (12) and tighten hex-lock nut (13).

(7) Assemble spring rod (14), compression spring (15), washer (16), and hex-lock nut (17) and install spring rod (14) in rod head (8).

(8) Tighten hex-lock nut (17).

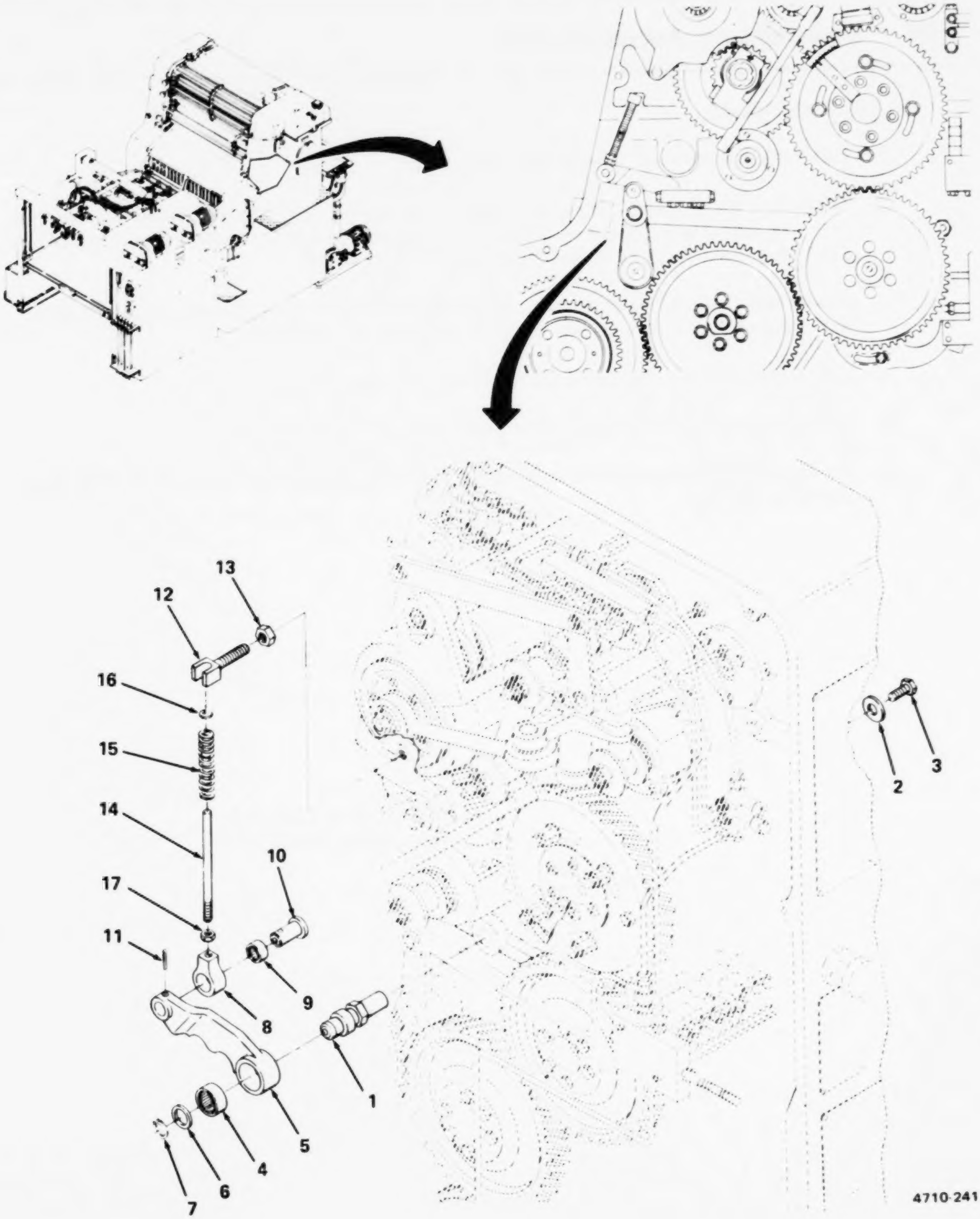
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Figure 2-73. Engaging Lever Assembly Installation.

2-36. Engaging Lever Assembly (cont).

d. *Adjust.* (figure 2-74)

(1) Using manual lever, put press in Impression OFF.

(2) Check that roller of engaging lever latch (1) is resting evenly in the left (feeder end) notch of the engaging lever (2). Check that roller is not held too tightly in notch or too loosely (look for uneven spacing around the roller).

(3) Adjust latch roller fit by loosening lock nut (3) on engaging lever (2) and rotating rod (4) left or right to lower or raise position of engaging lever as required.

(4) Tighten lock nut (3) when proper roller position is attained.

(5) Using manual lever, put press in Impression ON.

(6) Repeat steps (2) through (4) for adjustment of roller in the right (delivery end) notch of the engaging lever (2).

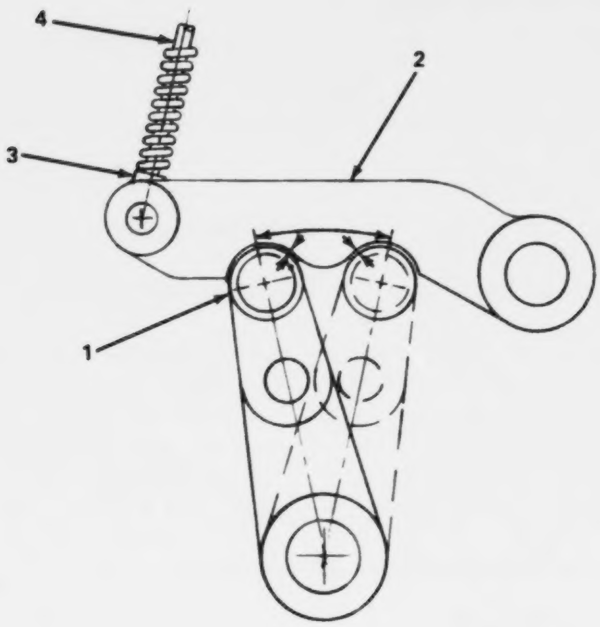

Figure 2-74. Engaging Lever Adjustment.

NOTE

FOLLOW-ON MAINTENANCE:
Install main guard assembly (D/S) (para. 2-20).

2-37. Dampening Fountain Assembly.

This task covers: a. Replace b. Repair

INITIAL SETUP

Tools	*Equipment Condition*
8 mm combination wrench 24 mm combination wrench	Dampening fountain empty

a. *Replace.* (figure 2-75)

(1) Remove two hex-head bolts (1).

(2) Slide fountain assembly (2) out of side brackets (3).

(3) Slide fountain assembly (2) into slots in side brackets (3).

(4) Replace two hex-head bolts (1).

b. *Repair.* (figure 2-75)

(1) Unscrew and remove drain valve (4). Replace if damaged or leaking.

(2) Replace drain valve (4).

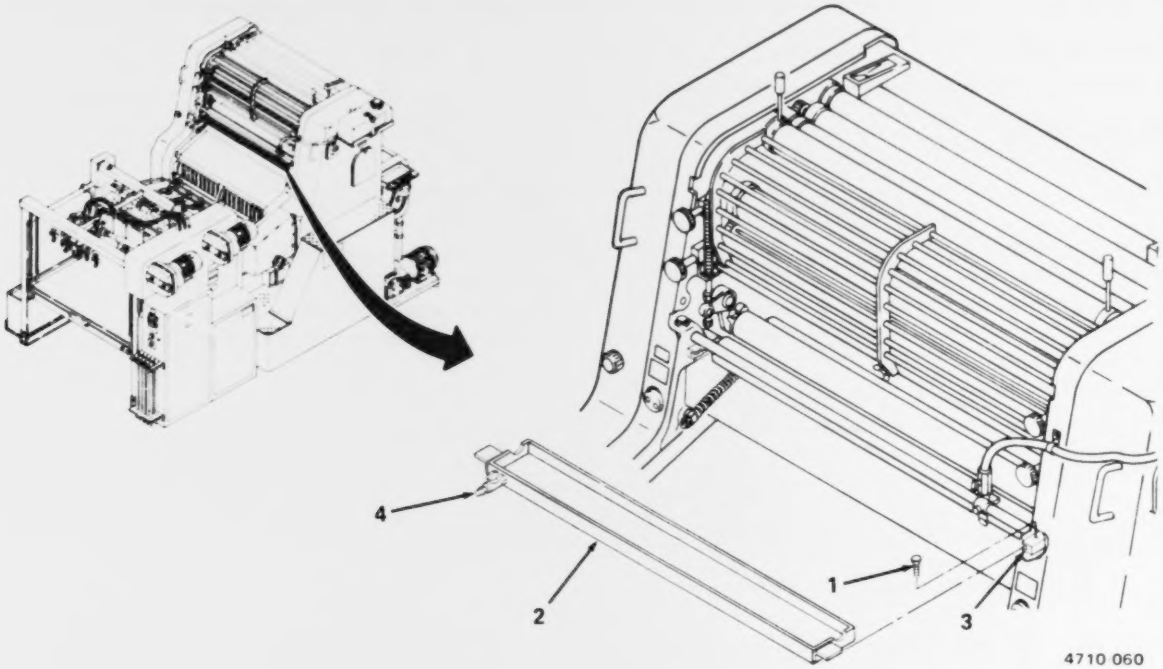
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Figure 2-75. Dampening Fountain Assembly Replacement.

2-38. Dampening Oscillator Bearing Assemblies.

This task covers: a. Remove b. Repair c. Install

INITIAL SETUP

Tools

4 mm pin punch
6 mm hex key
0.050 x 0.375 x 8 in. flat-tip screwdriver
Extractor device
Ball-peen hammer

Equipment Conditions

Form dampening rollers removed (TM 5-3610-286-10)
Main guard assembly removed (para. 2-20)
Oscillator lever assembly removed (para. 2-26)

a. Remove. (figure 2-76)

(1) Remove spring tension pin (1).

(2) Remove castellated nut (2).

(3) Remove two washers (3) and collar (4).

(4) Remove three socket-head screws (5), three lockwashers (6), and bearing housing (7).

(5) Remove two ball bearings (8) and pinion gear (9) from trunnion shaft (10).

b. Repair. (figure 2-76)

(1) Replace worn or binding bearings (8).

(2) Replace worn or damaged pinion gear (9).

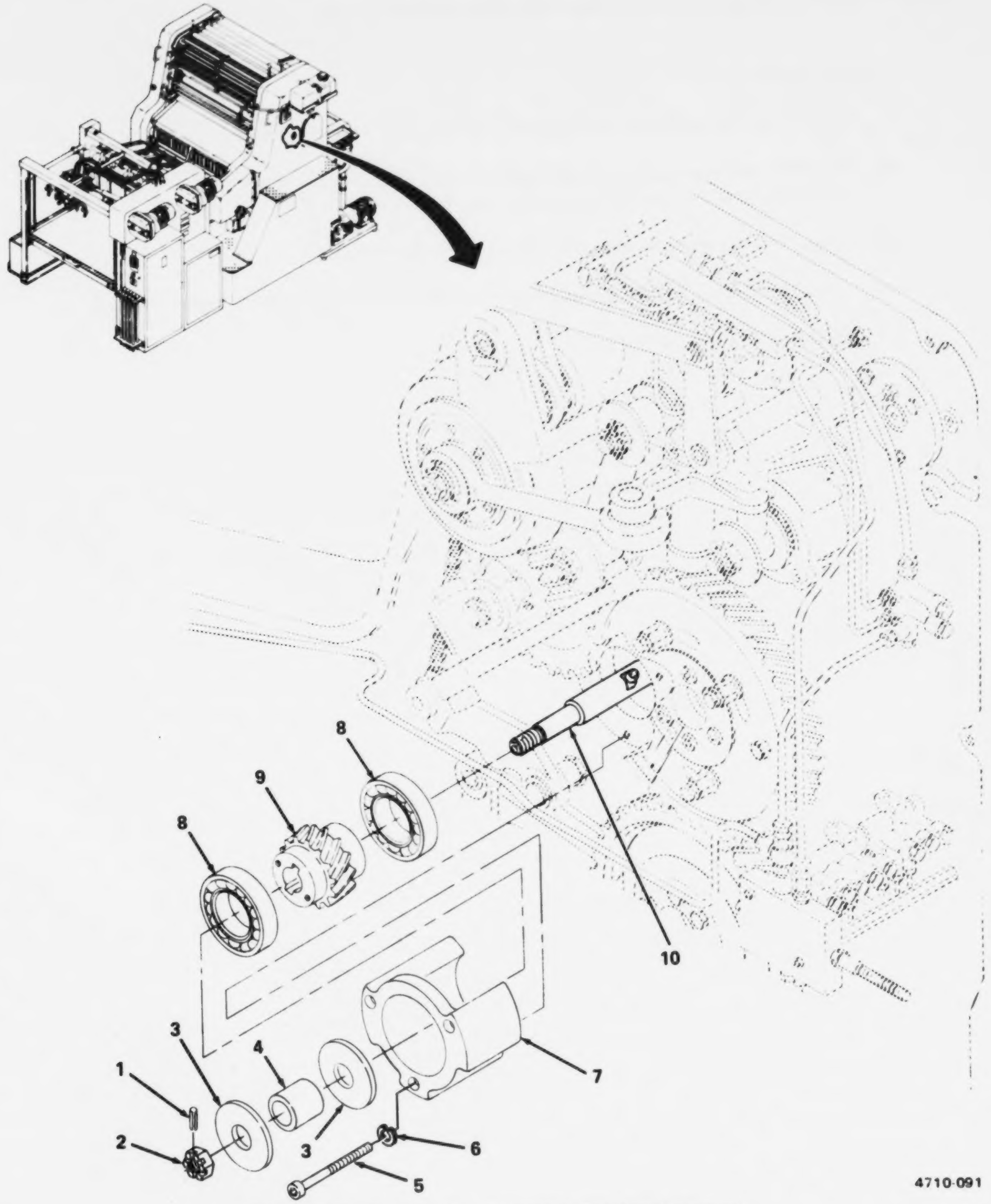
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Figure 2-76. Dampening Oscillator Bearing Removal.

2-38. Dampening Oscillator Bearing Assemblies (cont).

c. *Install.* (figure 2-77)

(1) Install two ball bearings (1) and pinion gear (2) on trunnion shaft (3).

(2) Position bearing housing (4) over ball bearings and pinion gear and install three lockwashers (5), and three socket-head screws (6).

(3) Install two washers (7) and collar (8) on trunnion shaft (3).

(4) Install castellated nut (9) and aline slot on nut with hole in end of trunnion shaft (3).

(5) Install spring trension pin (10).

NOTE

FOLLOW-ON MAINTENANCE:
(1) Replace oscillator lever assembly (para. 2-26).
(2) Replace form dampening rollers (TM 5-3610-286-10).
(3) Replace main guard assembly (para. 2-20).

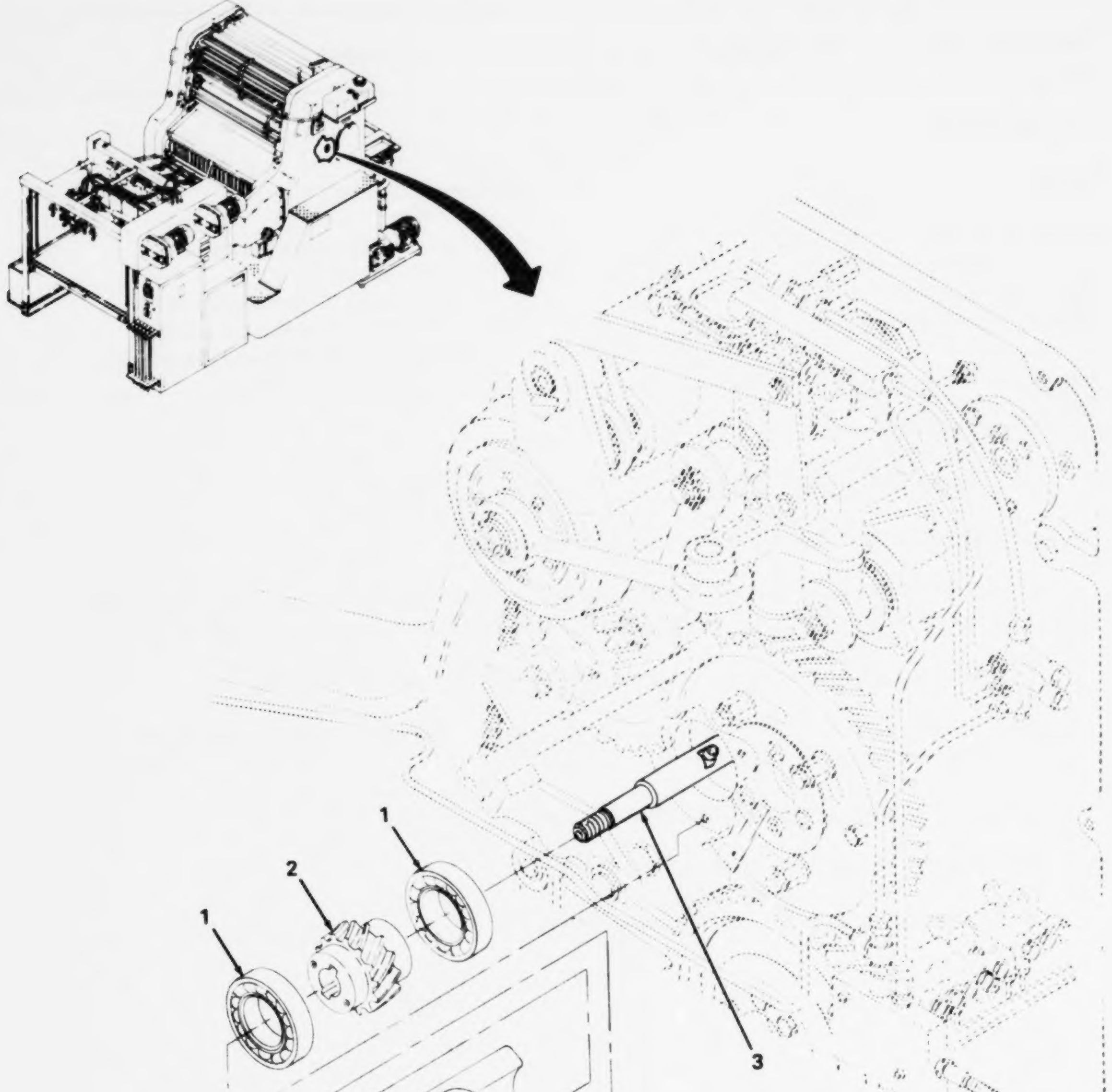
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Figure 2-77. Dampening Oscillator Bearing Assemblies Installation.

2-39. Disengaging Shaft Assembly.

This task covers: a. Remove b. Repair c. Install

INITIAL SETUP

Tools	*Equipment Conditions*
4 mm pin punch 10 mm combination wrench Retaining-ring pliers Ball-peen hammer	Form dampening rollers removed (TM 5-3610-286-10) Upper guard (O/S) removed (para. 2-18) Main guard (D/S) removed (para. 2-20) Dampening fountain removed (para. 2-37)

---

a. *Remove.* (figure 2-78)

(1) Remove two taper pins (1).

(2) Remove two retaining rings (2) and two washers (3).

(3) Slide shaft (4) out through O/S of press frame while grasping and removing both lockout levers (5) from shaft (4) as it is pulled through the press frame.

(4) Loosen two lock nuts (6) and remove spring rods (7) from rod heads (8).

(5) Remove two lock nuts (6), compression springs (9), washers (10), and guide pieces (11) from spring rods (7).

(6) Remove spring tension pin (12) and handle (13).

(7) Remove spring tension pin (14) and stud (15).

(8) Remove two tension pins (16) and lever (17).

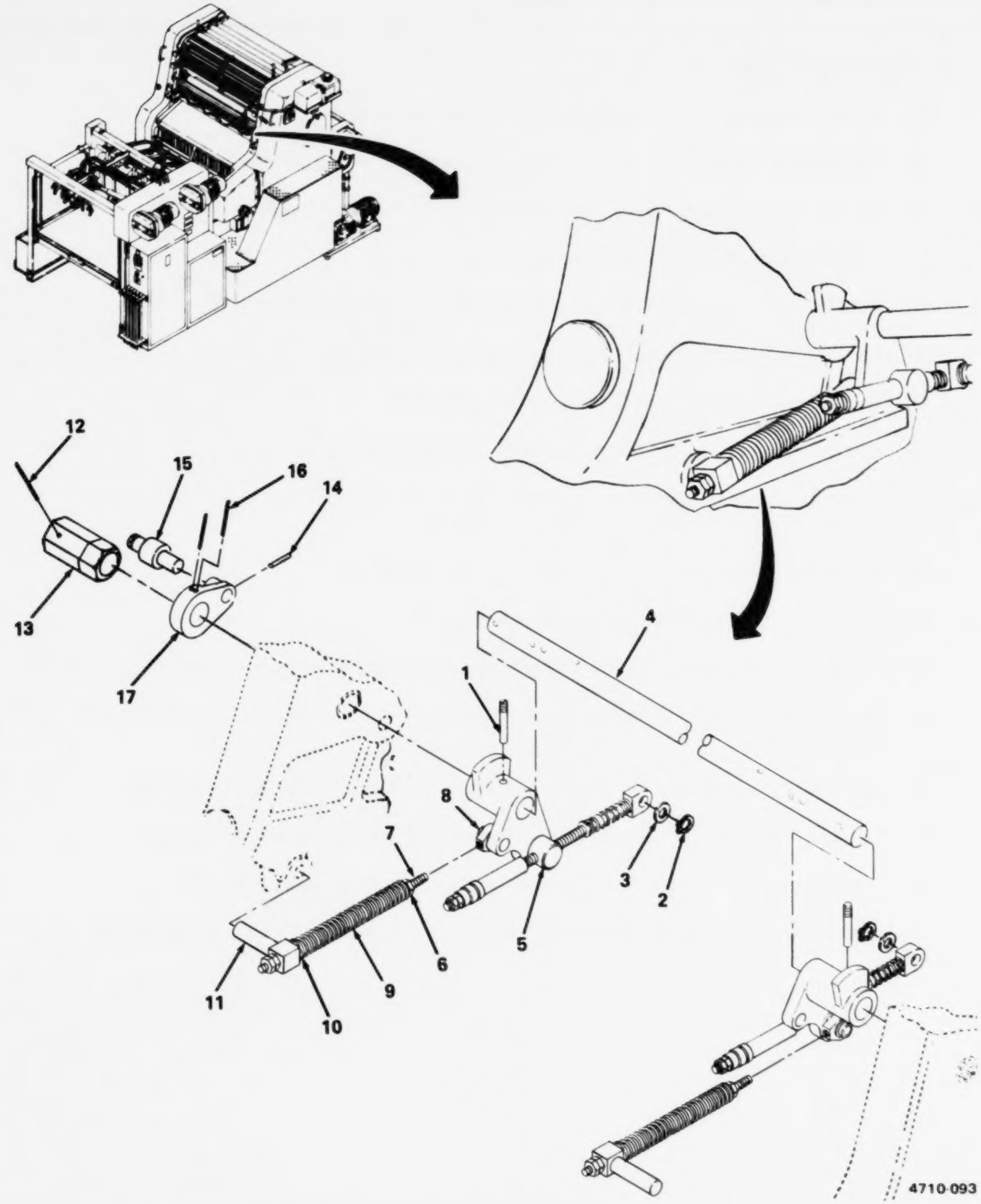
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Figure 2-78. Disengaging Shaft Assembly Removal.

2-39. Disengaging Shaft Assembly (cont).

b. *Repair.* (figure 2-79)

(1) Remove two hex nuts (1), washers (2), and compression springs (3).

(2) Remove four hex nuts (4), spring rod (5), and washer (6) from guide piece (7).

(3) Remove two retaining rings (8), four washers (9), and spring rod guides (10).

(4) Remove four hex nuts (11) and adjusting screws (12).

(5) Remove two spring rods (13), compression springs (14), and washers (15).

(6) Remove two retaining rings (16), rod heads (17), and pins (18).

(7) Remove needle bushings (19) from lockout levers (20).

(8) Remove needle bushings (21) from O/S and D/S side frames.

(9) Replace weak or broken compression springs (3, 14). Replace stripped adjusting screws (12) and frozen or binding needle bushings (19, 21).

(10) Replace needle bushings (21) in (O/S) and (D/S) side frames.

(11) Replace needle bushings (19) in lockout levers (20).

(12) Replace two retaining rings (16), pins (18) and rod heads (17) on lockouts (20).

(13) Replace two spring rods (13), compression springs (14), and washers (15) on spring rod guides (10).

(14) Replace two adjusting screws (12) and four hex nuts (11) on spring rod guides (10).

(15) Replace two spring rod guides (10), four washers (9), and two retaining rings (8).

(16) Replace four hex nuts (4), spring rods (5), and washers (6) on guide pieces (7).

(17) Replace two compression springs (3), washers (2) and hex nuts (1) on guide pieces (7).

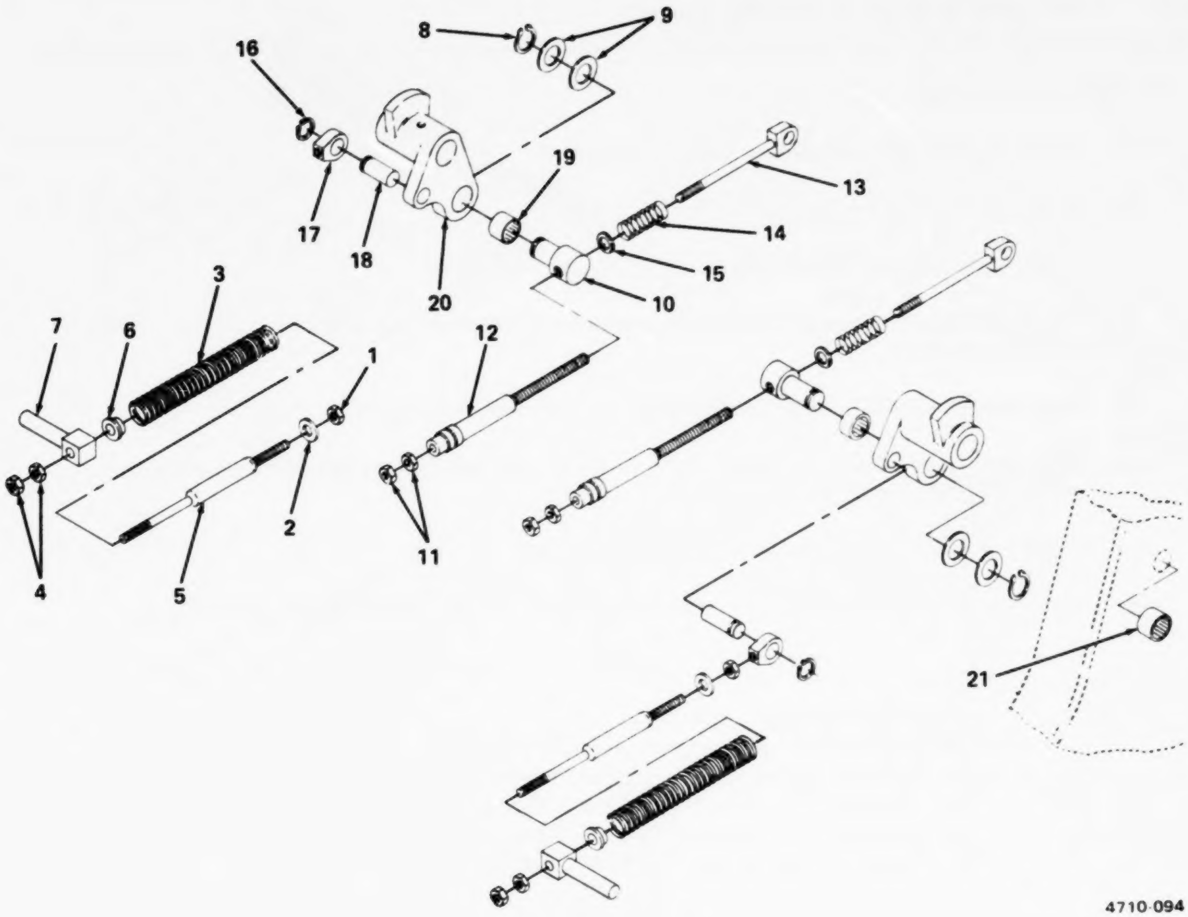
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Figure 2-79. Disengaging Shaft Assembly Repair.

2-39. Disengaging Shaft Assembly (cont).

c. *Install.* (figure 2-80)

(1) Install lever (1) and two tension pins (2) on shaft (3).

(2) Install stud (4) and spring tension pin (5) on shaft (3).

(3) Install handle (6) and spring tension pin (7) on shaft (3).

(4) Install two guide pieces (8), washers (9), compression springs (10), and lock nuts (11) on spring rods (12).

(5) Install spring rods (12) in rod heads (13) and tighten lock nuts (11).

(6) Slide shaft (3) in through O/S or press frame and install two lockout levers (14) when shaft end passes through press frame.

(7) Install two washers (15) and two retaining rings (16).

(8) Aline holes in lockout lever (14) with holes in shaft (3) and install two taper pins (17).

NOTE

FOLLOW-ON MAINTENANCE:
(1) Replace dampening fountain (para. 2-37).
(2) Replace form dampening rollers (TM 5-3610-286-10).
(3) Replace main guard (D/S) (para. 2-20).
(4) Replace upper guard (O/S) (para. 2-18).
(5) Adjust swiveling lever (TM 5-3610-286-10).

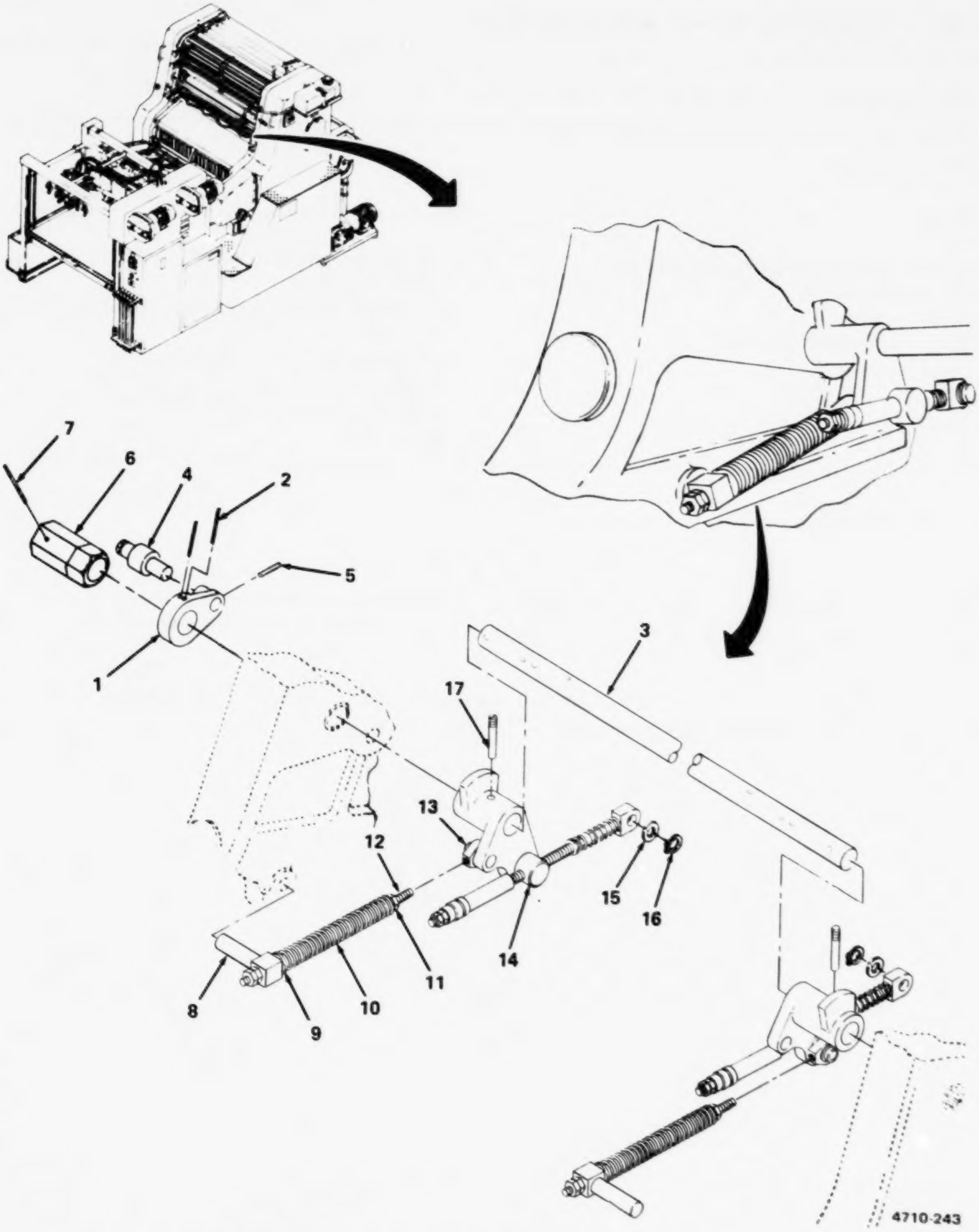
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Figure 2-80. Disengaging Shaft Assembly Installation.

2-40. Dampening Swivel Lever Assemblies.

This task covers: a. Remove b. Inspect c. Repair d. Install

INITIAL SETUP

Tools	*Equipment Conditions*
0.050 x 0.375 x 8 in. flat-tip screwdriver 8 in. bronze punch 5 mm hex key 8 mm combination wrench Ball-peen hammer Retaining-ring pliers	Form dampening rollers removed (TM 5-3610-286-10) Dampening fountain assembly removed (para. 2-37) Main guard (D/S) removed (para. 2-20) Upper guard (O/S) removed (para. 2-18) Dampening oscillator roller removed (para. 2-38)

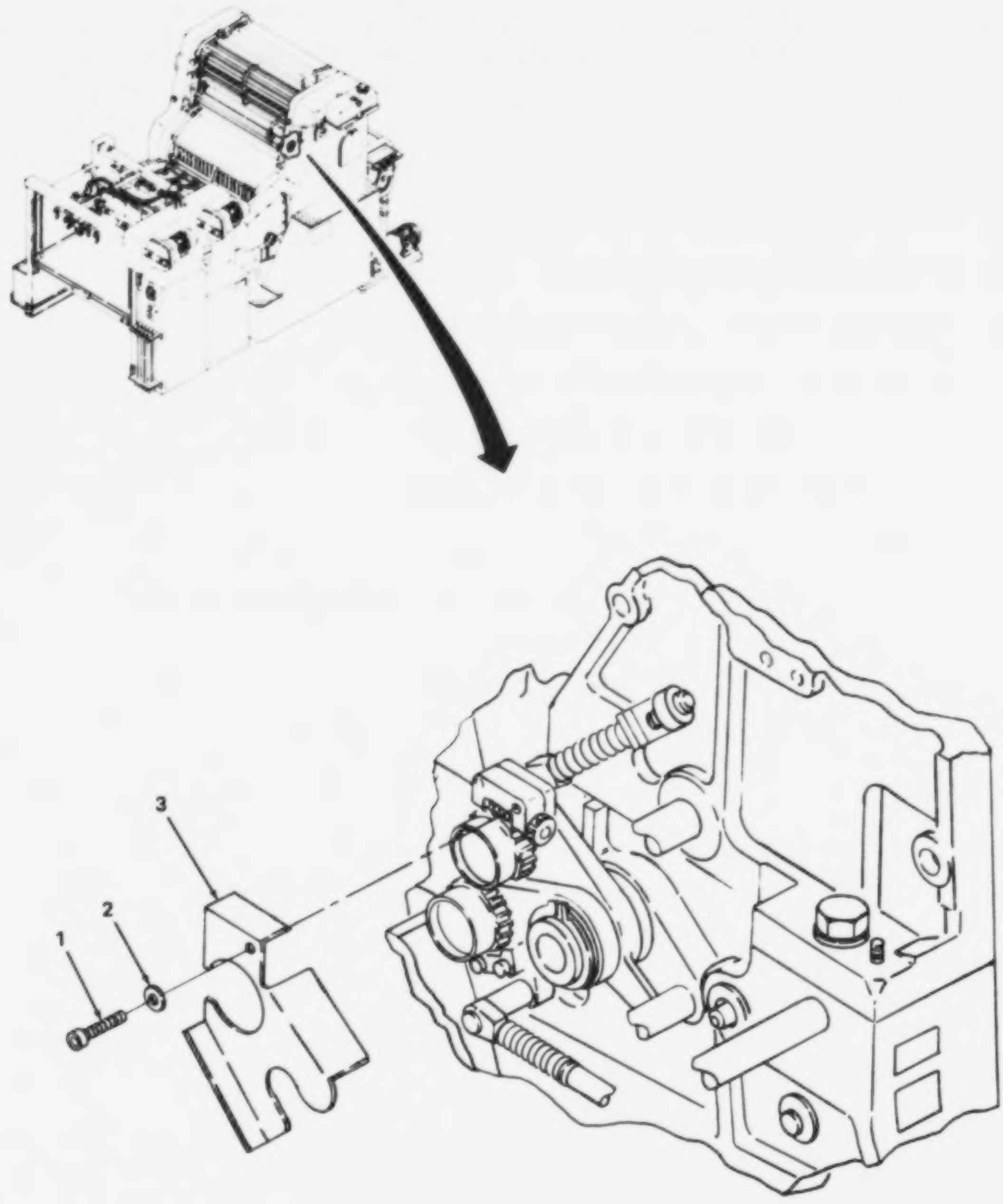
---

a. Remove.

NOTE

Procedures for removal and installation of dampening swivel lever assemblies are the same for both the D/S and O/S, except for the use of a splash guard on the D/S.

(1) *Splash guard.* (figure 2-81). Remove cap screw (1), washer (2), and splash guard (3) from D/S swivel lever assembly.



4710-095(1/2)

Figure 2-81. Splash Guard Removal.

2-40. Dampening Swivel Lever Assemblies (cont).

(2) *Dampening swivel lever assemblies (O/S, D/S).* (figure 2-82)

NOTE

Procedure shown in figure 2-82 is for O/S.

(a) Remove hex nut (1), adjusting screw (2), and sleeve (3).

(b) Remove retaining ring (4) and washer (5).

(c) Remove spring rod (6), rod guide (7), washer (8), and spring (9).

(d) Remove retaining ring (10) and washer (11).

(e) Remove lower swivel lever (12) and shims (13).

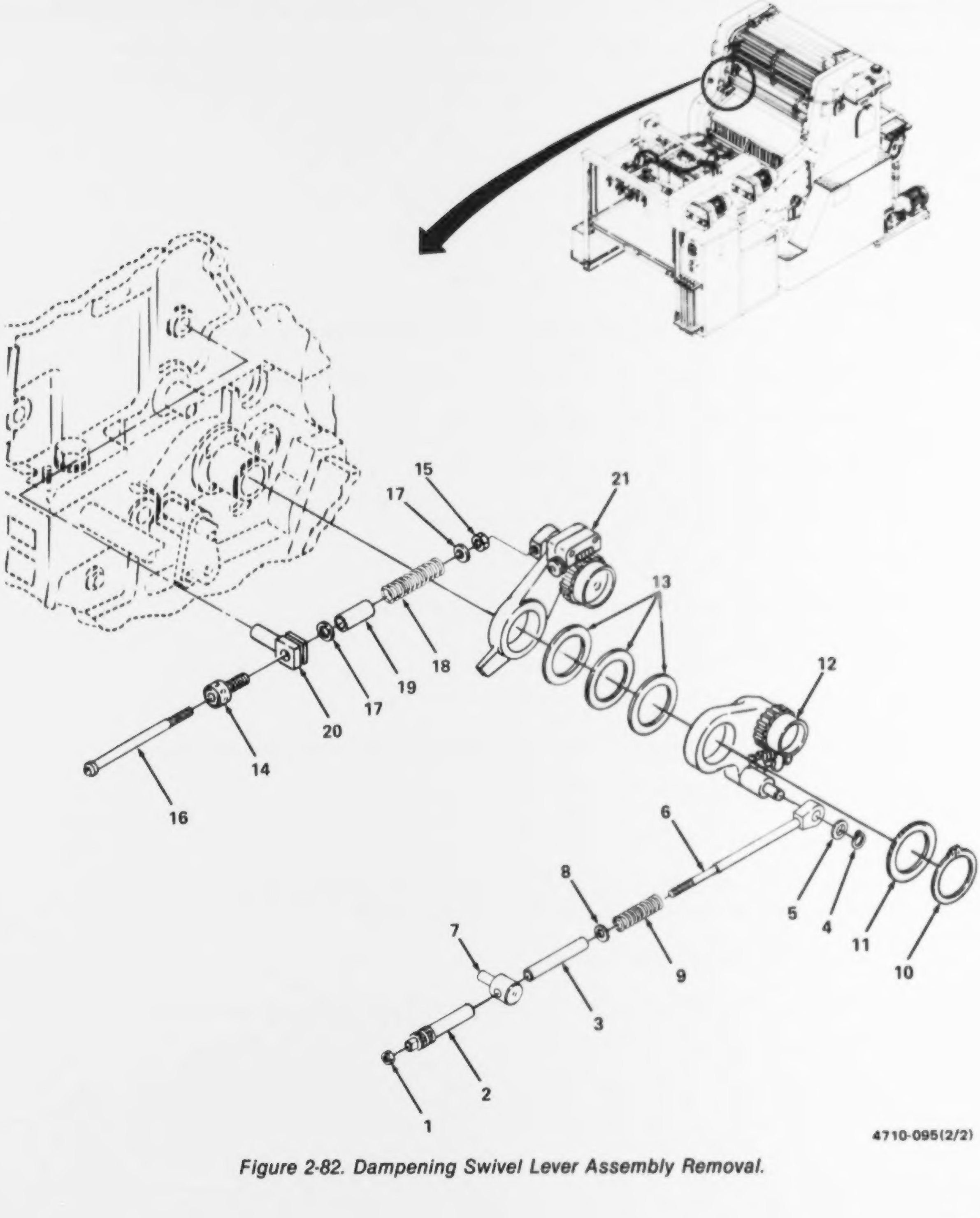
(f) Loosen adjusting screw (14) to relieve spring tension.

(g) Loosen hex nut (15).

(h) Remove spring rod (16), hex nut (15), two washers (17), spring (18), and sleeve (19).

(i) Remove adjusting screw (14) and spring rod guide (20).

(j) Remove upper swivel lever (21).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4710-095(2/2)

Figure 2-82. Dampening Swivel Lever Assembly Removal.

2-40. Dampening Swivel Lever Assemblies (cont).

b. *Inspect.*

(1) Inspect for evidence of corrosion or rust.

(2) Inspect for damaged splash guard.

(3) Inspect for weak or broken springs.

c. *Repair.* (figure 2-83)

NOTE

Repair of O/S and D/S swivel lever assemblies is the same.

(1) Remove socket-head screws (1) washers (2), and worm gear housings (3).

(2) Remove worm gears (4) and washers (5) and (6).

(3) Remove retaining rings (7) and washers (8). Remove journal boxes (9).

(4) Remove set screw (10), stop (11), and springs (12).

(5) Drive pin (13) from swivel lever (14).

(6) Remove retaining ring (15), pin (16), and spring rod head (17).

(7) Remove bushing (18).

(8) Remove grease fitting (19) from upper swivel lever (20).

(9) Replace damaged, broken, missing parts and parts which show excessive wear.

(10) Replace bushing (18).

(11) Replace grease fitting (19).

(12) Press pin (16) into spring rod head (17) and into center hole at top of upper swivel lever (20). Replace retaining ring (15).

(13) Press pin (13) into lower swivel lever (14).

(14) Insert stops (11), and springs (12) into journal box (9) and replace set screws (10).

(15) Insert assembled journals into swivel levers (14) and (20). Replace retaining rings (7) and washers (8).

(16) Replace washers (5) and (6), and worm gears (4) in worm gear housing (3).

(17) Mount assembled worm gears on swivel levers (14) and (20), ensuring worm gear meshes with gear surface of journal box (3), install washers (2) and socket-head screws (1).

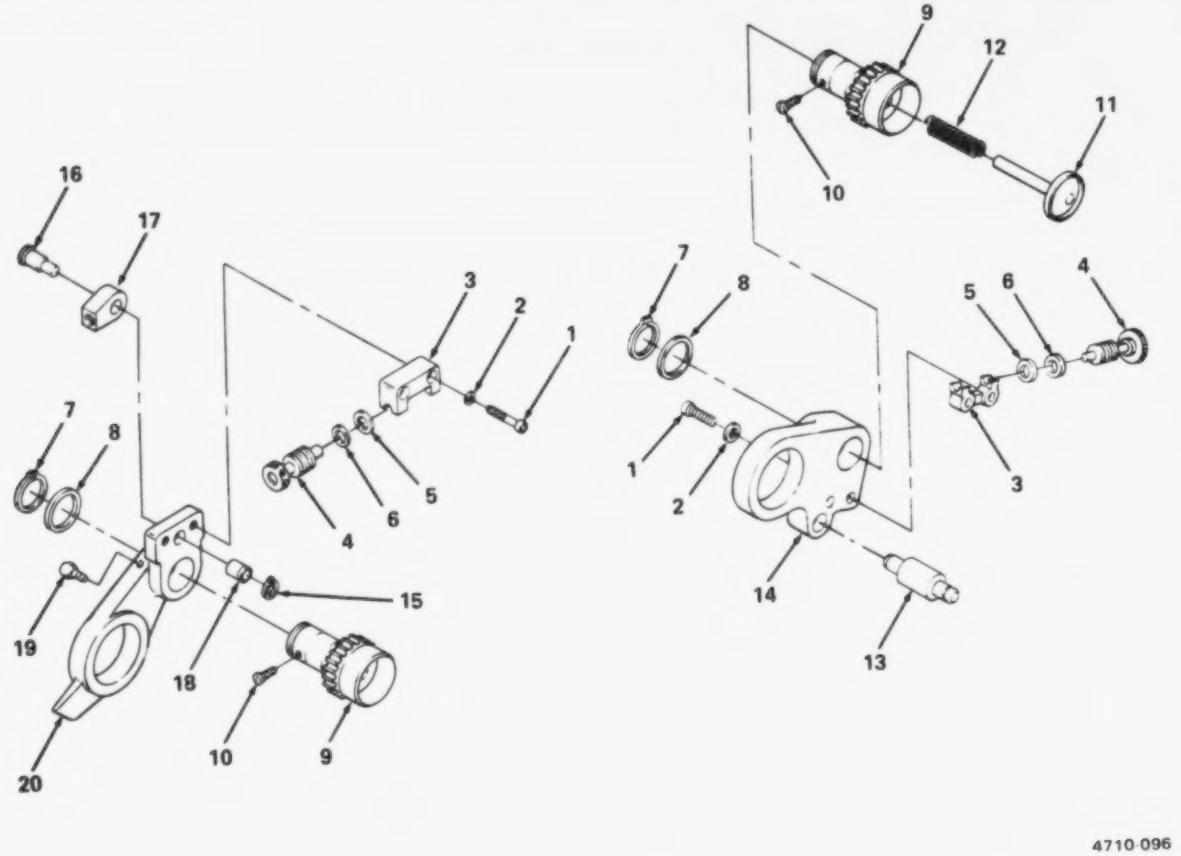
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Figure 2-83. Swivel Lever Repair.

2-40. Dampening Swivel Lever Assemblies (cont).

d. *Install.*

(1) *Dampening swivel lever assemblies (O/S, D/S).* (figure 2-84)

(a) Install upper swivel lever (1).

(b) Install spring rod guide (2) and adjusting screw (3).

(c) Guide spring rod (4) through adjusting screw (3). Install one washer (5), sleeve (6), spring (7), second washer (8), and hex nut (9). Hand tighten hex nut to allow spring rod threaded end to be exposed about one-half inch.

(d) Screw spring rod (4) into rod head (10) mounted on the back side of swivel lever (1).

(e) Tighten hex nut (9) against rod head (10) to lock spring rod (4) in place.

(f) Install shims (11) and lower swivel (12).

(g) Install washer (13) and retaining ring (14).

(h) Assemble spring rod (15), spring (16), washer (17), sleeve (18), and rod guide (19) and install on swivel lever (12) and engaging lever (20).

(i) Install washer (21) and retaining ring (22).

(j) Install and adjust adjusting screw (23).

(k) Install hex nut (24) and tighten it against adjusting screw (23) to lock in place.

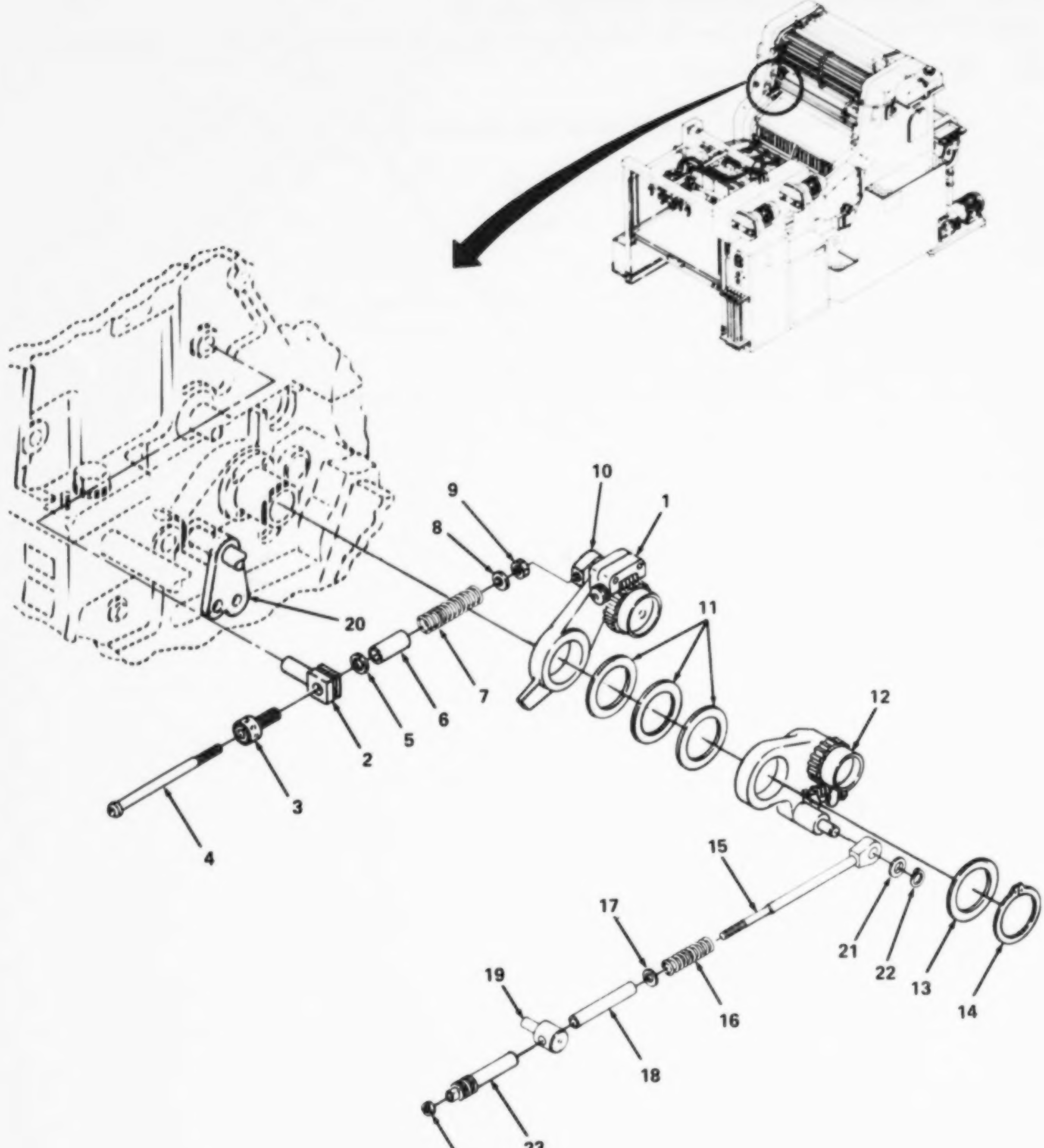
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Figure 2-84. Dampening Swivel Lever Assembly Installation.

2-40. Dampening Swivel Lever Assemblies (cont).

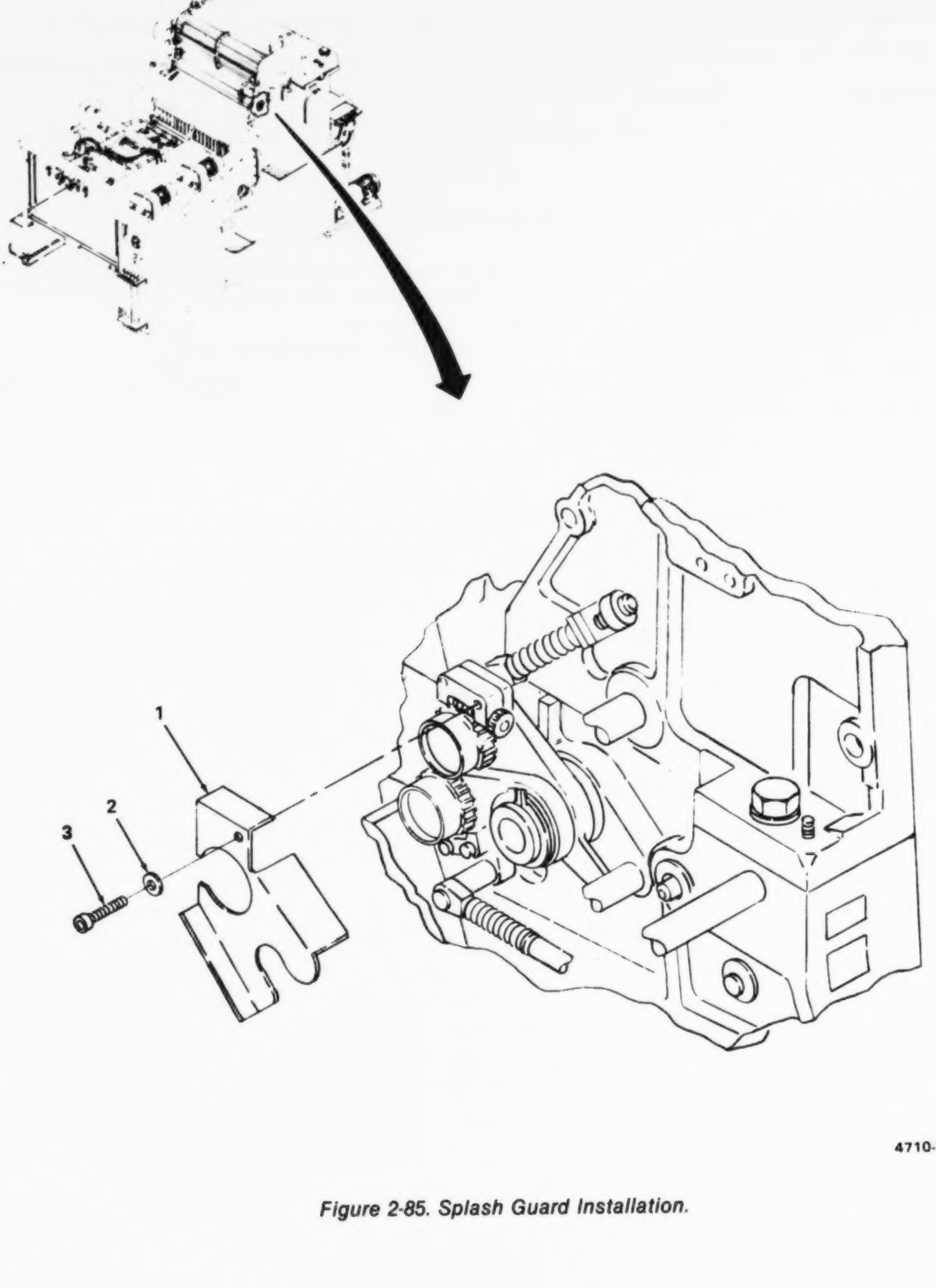
(2) *Splash guard.* (figure 2-85)

(a) Install splash guard (1) on D/S swivel lever assembly.

(b) Install washer (2) and socket-head screw (3).

NOTE

FOLLOW-ON MAINTENANCE:
(1) Install dampening oscillator roller bearing (para. 2-38).
(2) Install dampening fountain assembly (para. 2-37).
(3) Install upper guard (O/S) (para. 2-18).
(4) Install main guard (D/S) (para. 2-20).
(5) Install form dampening rollers (TM 5-3610-286-10).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4710-244 (1/2)

Figure 2-85. Splash Guard Installation.

2-41. Bearing Bolt Assembly.

This task covers: a. Replace b. Repair

INITIAL SETUP

Tools	*Equipment Conditions*
Retaining-ring pliers Ball-peen hammer 10 mm combination wrench	Dampening fountain assembly removed (para. 2-37) Dampening vibrator roller removed (TM 5-3610-286-10) Main guard (D/S) removed (para. 2-20)

a. *Replace.* (figure 2-86)

WARNING

Spring under compression is released when performing step 1.

(1) Remove two hex-head screws (1), two washers (2), cover plate (3), and compression spring (4).

(2) Remove retaining ring (5).

(3) Slide bearing bolt (6) through side frame and remove.

(4) Pull needle bearing (7) from bearing bolt (6).

(5) Install needle bearing (7) into bearing bolt (6).

(6) Install bearing bolt (6) into side frame.

(7) Install retaining ring (5).

(8) Install compression spring (4), coverplate (3), two washers (2), and two hex-head screws (1).

b. *Repair.* (figure 2-86)

(1) Replace frozen or binding needle bearing (7).

(2) Replace broken or weak compression spring (4).

(3) Replace worn or corroded bearing bolt (6).

NOTE

If new bearing bolt is to be installed, remove retaining ring (5) from old bearing bolt and use on new one.

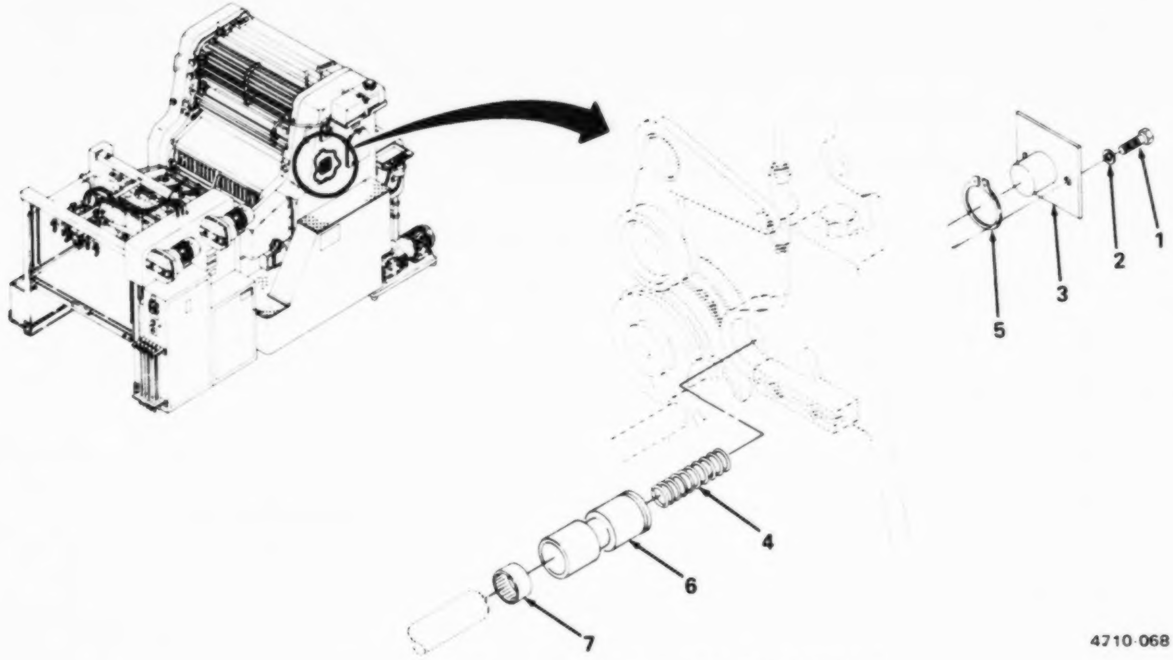

Figure 2-86. Bearing Bolt Assembly Replacement.

NOTE

FOLLOW-ON MAINTENANCE:
(1) Install dampening fountain assembly (para. 2-37).
(2) Install dampening vibrator roller (TM 5-3610-286-10).
(3) Install main guard (D/S) (para. 2-20).

2-42. Disengaging Assembly.

This task covers: a. Replace b. Repair

INITIAL SETUP

Tools

Ball-peen hammer
4 mm pin punch
6 mm pin punch
6 mm hex key
17 mm combination wrench

Equipment Conditions

Upper guard (O/S) removed (para. 2-18)

a. Replace. (figure 2-86)

(1) Remove two spring tension pins (1) and handle (2).

(2) Remove two socket-head cap screws (3), washers (4), and disengaging assembly (5).

(3) Remove hex nut (6), set screw (7), and washer (8).

(4) Remove bearing (9) from O/S side frame.

(5) Install bearing (9) in O/S side frame.

(6) Install set screw (7), washer (8), and hex nut (6).

(7) Install disengaging assembly (5) in bearing (9) and replace two socket-head cap screws (3) and washers (4).

(8) Install handle (2) and two spring tension pins (1).

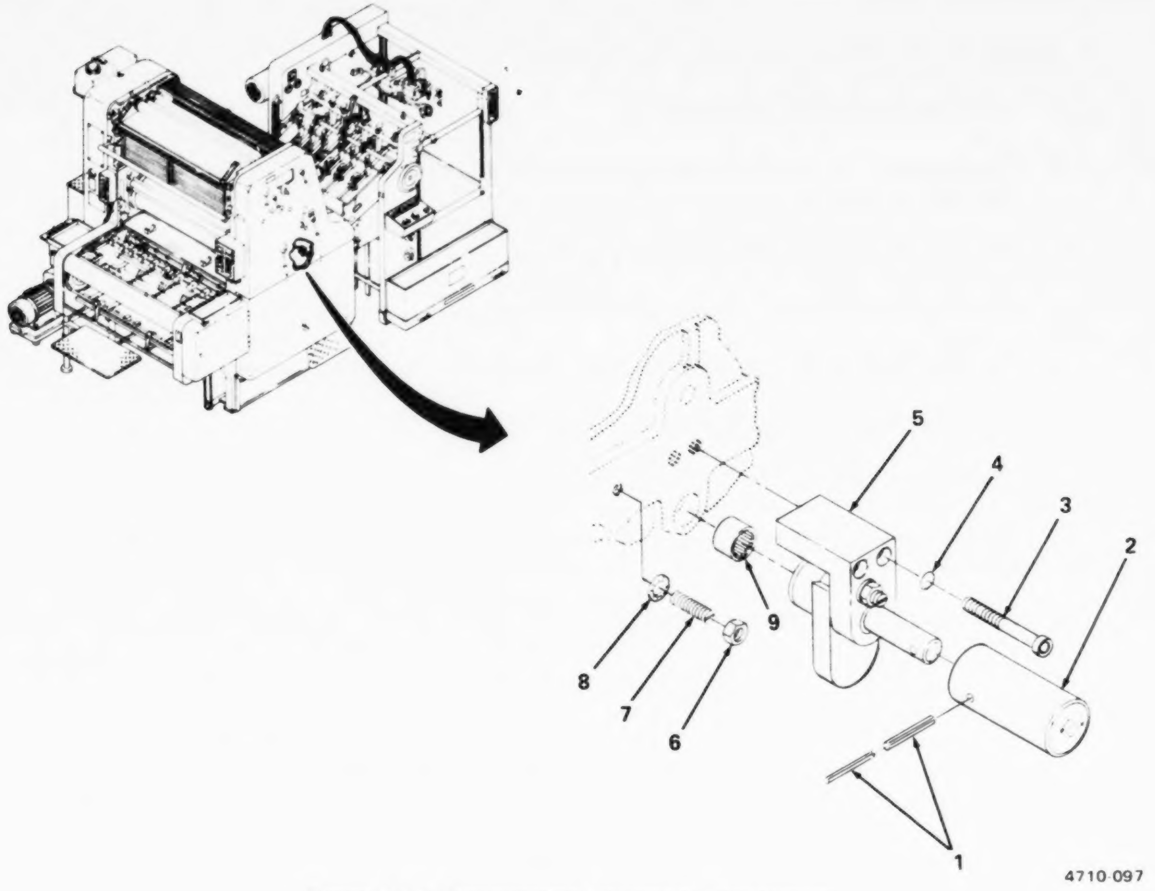
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Figure 2-87. Disengaging Assembly Replacment.

2-42. Disengaging Assembly (cont).

b. Repair. (figure 2-88)

(1) Slide bearing bracket (1) off shaft (2).

(2) Remove two spring tension pins (3) and remove shaft (2) and washer (4) from disengaging cam (5).

(3) Remove hex nut (6), washer (7), and stop pin (8).

(4) Remove needle bushing (9) from bearing bracket (1).

(5) Replace frozen or binding needle bushing (9). Replace broken or missing stop pin (8).

(6) Replace needle bushing (9) in bearing bracket (1).

(7) Replace stop pin (8), washer (7), and hex nut (6).

(8) Replace shaft (2) and washer (4) on disengaging cam (5) and replace two spring tension pins (3).

(9) Slide bearing bracket (1) onto shaft (2).

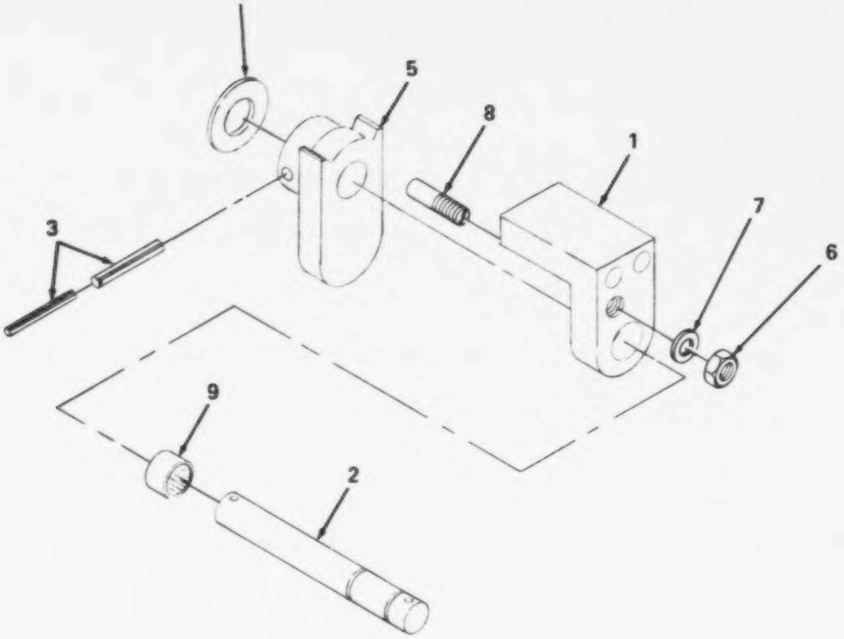
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Figure 2-88. Disengaging Assembly Repair.

NOTE

FOLLOW-ON MAINTENANCE:
Install upper guard (O/S) (para. 2-18).

2-43. Swing Gears.

This task covers: a. Remove b. Repair c. Install

INITIAL SETUP

Tools	*Equipment Conditions*
6 mm hex key 10 mm hex key 10 mm combination wrench 19 mm combination wrench 4 mm pin punch Ball-peen hammer	Main guard (D/S) removed (para. 2-20) Lubrication distribution line removed (para. 2-78) Printing press "O" position (TM 5-3610-286-10)

a. *Remove.* (figure 2-89)

NOTE

Block plate cylinder so that it does not rotate when swing gear is removed.

(1) Remove socket-head screw (1), washer (2) and pointer (3).

(2) Remove four hex nuts (4), washers (5), hex spacer nuts (6), cup spring washers (7), and spacer washers (8).

(3) Remove gear (9).

(4) Remove six socket-head cap screws (10), washers (11), pin (12), and flange gear (13).

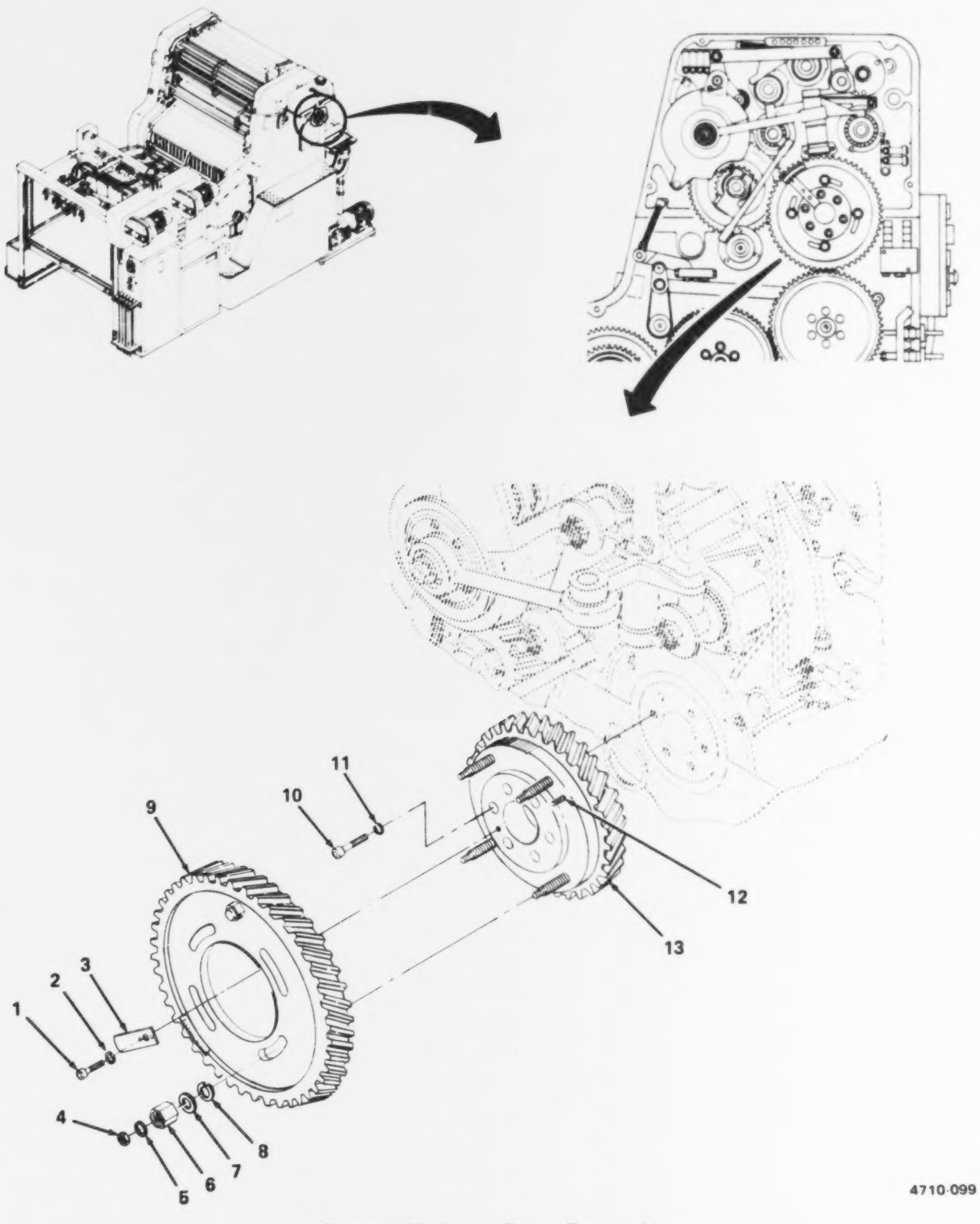
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Figure 2-89. Swing Gears Removal.

2-43. Swing Gears (cont).

b. *Repair.* (figure 2-90)

(1) Remove pin (1), collar (2), and pinion gear (3).

(2) Replace stripped or worn pinion gear (3).

(3) Replace pinion gear (3), collar (2) and pin (1) in gear (4).

(4) Remove four socket-head cap screws (5) and washers (6) and separate flange (7) from gear (8).

(5) Remove four threaded studs (9) from flange (7).

(6) Replace gears (4, 8) if worn or if teeth are chipped or missing. Replace flange (7) if pinion gear teeth are worn or chipped. Replace stripped threaded studs (9).

NOTE

If gear (8) is replaced, new gear will not have positioning holes. If not, refer to MAC (Appendix B). If hole is present, or old gear (8) is replaced, go to step (7).

(7) Replace four threaded bolts (9) into flange (7).

(8) Aline flange (7) and gear (8) in "O" position (O/S end of tapered pin (10) in locator hole in gear (8)) and replace four socket-head cap screws (5) and washers (6).

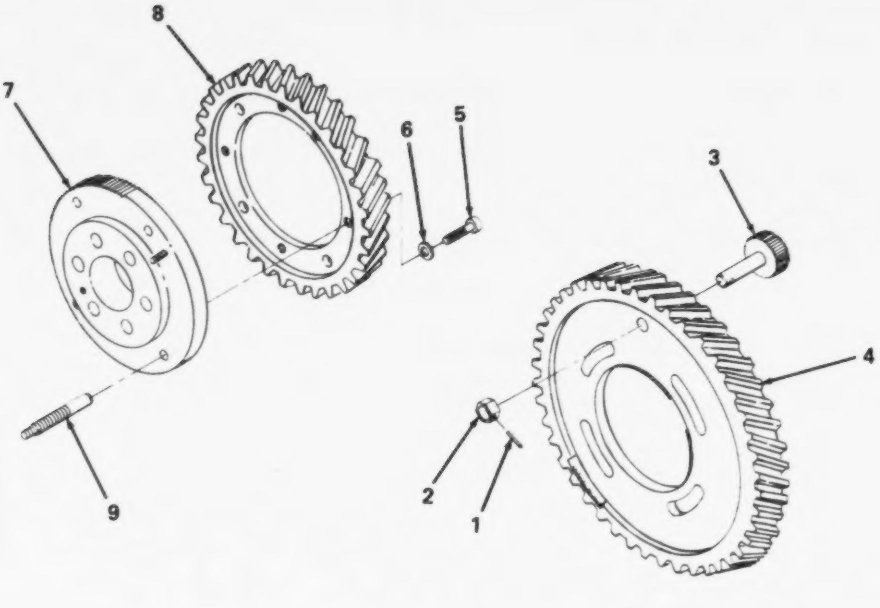

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Figure 2-90. Swing Gears Repair.

2-43. Swing Gears (cont).

c. *Install.* (figure 2-91)

(1) Install flange gear (1) in "O" position (per mark), and install pin (2), six washers (3), and six socket-head cap screws (4).

(2) Position gear (5) in "O" position and install into flange gear threaded studs (6).

(3) Replace four spacer washers (7), cap spring washers (8), hex spacer nuts (9), washers (10), and hex nuts (11).

(4) Replace pointer (12), washer (13), and socket-head screw (14).

NOTE

FOLLOW-ON MAINTENANCE:
(1) Install lubrication distribution line (para. 2-78).
(2) Install main guard (para. 2-20).

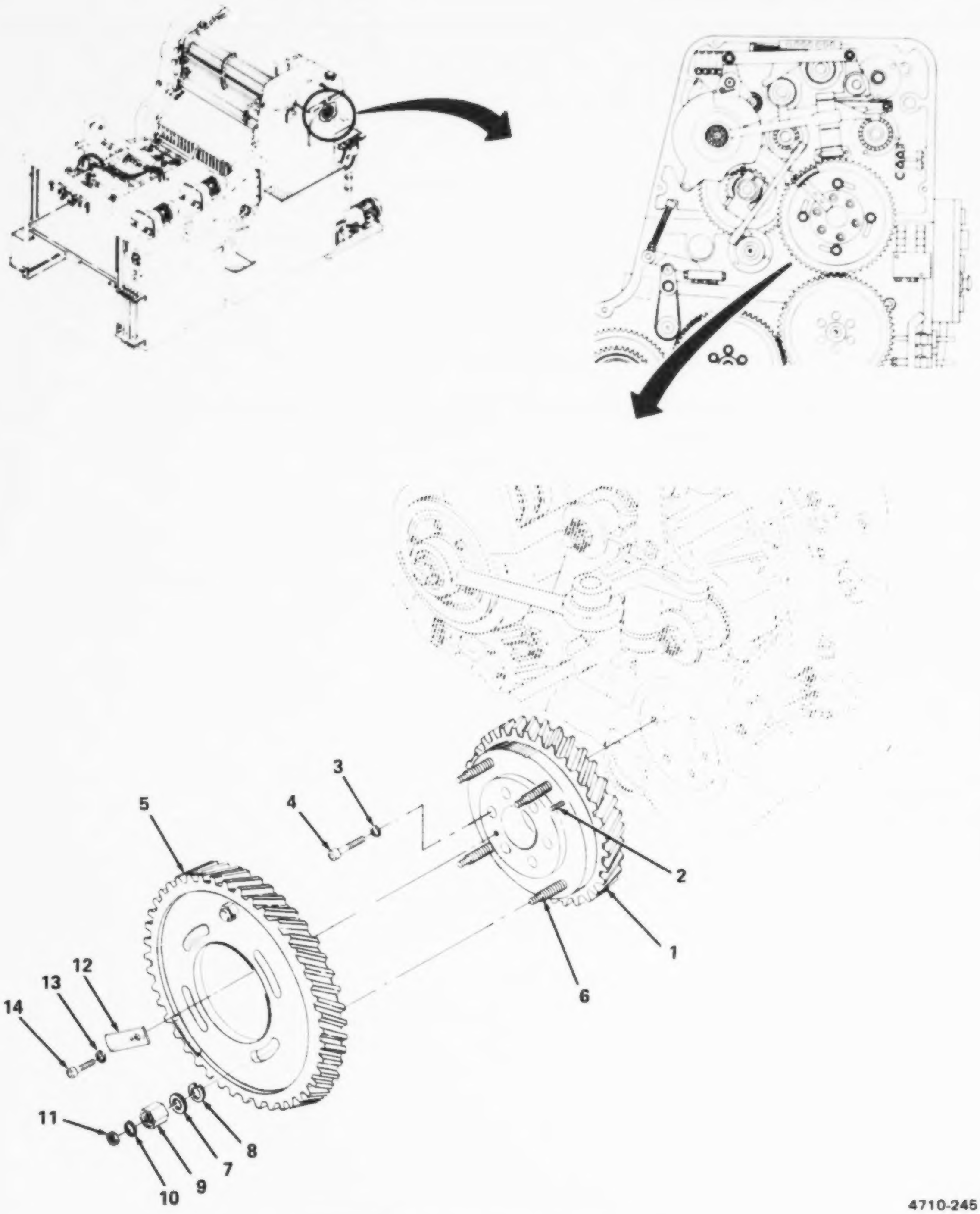
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Figure 2-91. Swing Gears Installation.

2-44. Plate Cylinder Assembly.

This task covers: a. Replace b. Repair

INITIAL SETUP

Tools	*Equipment Conditions*
Rubber mallet	Deflector assembly raised (para. 2-73)

a. *Replace.* (figure 2-92)

(1) Slide plate cylinder guard (1) toward D/S and remove.

(2) Insert stud (2) on O/S end of plate cylinder guard (1) into hole in plate cylinder (3), push guard in and replace.

b. *Repair.*

(1) Hammer out dents in guard.

(2) Replace guard if it will not remain in place, or is loose when mounted on plate cylinder.

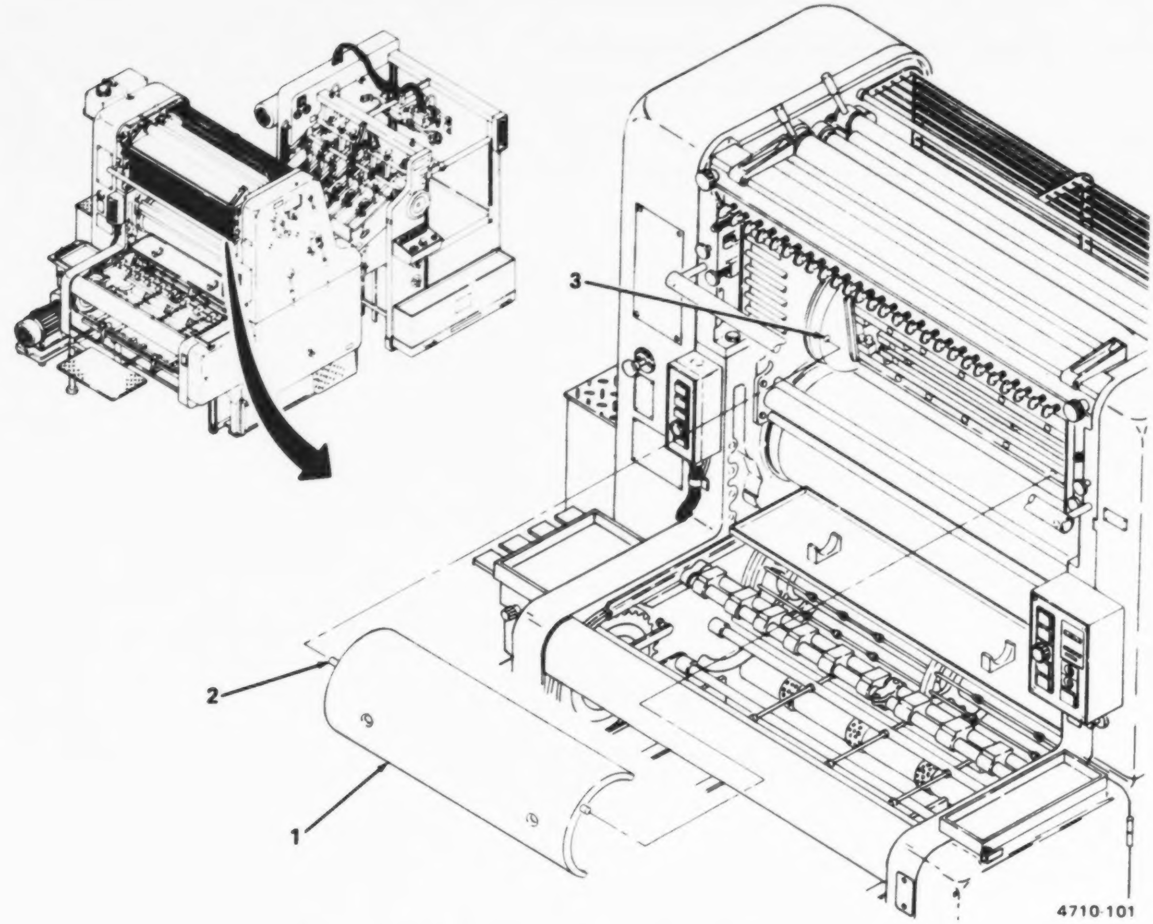


Figure 2-92. Plate Cylinder Guard Replacement.

NOTE

FOLLOW-ON MAINTENANCE:
Lower deflector assembly (para. 2-73).

2-45. Cover Plate Assembly (Plate Cylinder).

This task covers:	a. Replace	b. Repair

INITIAL SETUP

Tools	*Equipment Conditions*
6 mm hex key	Upper guard (O/S) removed (para. 2-18)

a. *Replace.* (figure 2-93)

(1) Remove three socket-head screws (1), washers (2), and cover plate (3).

(2) Remove cup spring washers (4), bearing disc (5), and axial needle bearing (6).

NOTE

Number of cup spring washers will vary between printing presses.

(3) Replace axial needle bearing (6), bearing disc (5), and cup spring washers (4).

(4) Replace cover plate (3), washers (2), and three socket-head screws (1).

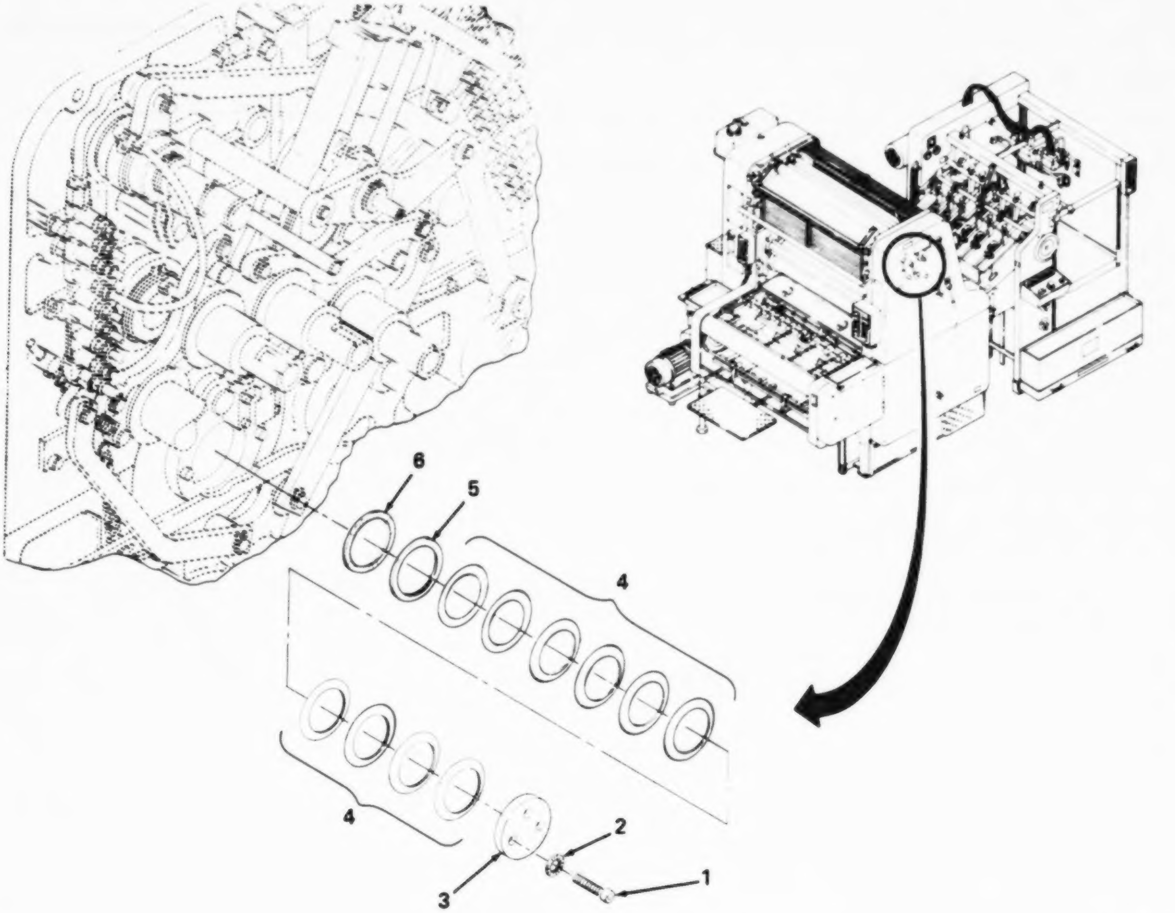
b. *Repair.* (figure 2-93)

(1) Replace flattened or deformed cup washers (4).

(2) Replace frozen or binding axial needle bearing (6).

(3) Replace worn bearing disc (5).

(4) Add cup washers (4) as needed to reduce plate cylinder end play.



4710-103

Figure 2-93. Cover Plate Assembly (Plate Cylinder) Replacement.

NOTE

FOLLOW-ON MAINTENANCE:
Replace upper guard (O/S) (para. 2-18).

2-46. Plate Clamp.

This task covers: a. Remove b. Repair c. Install

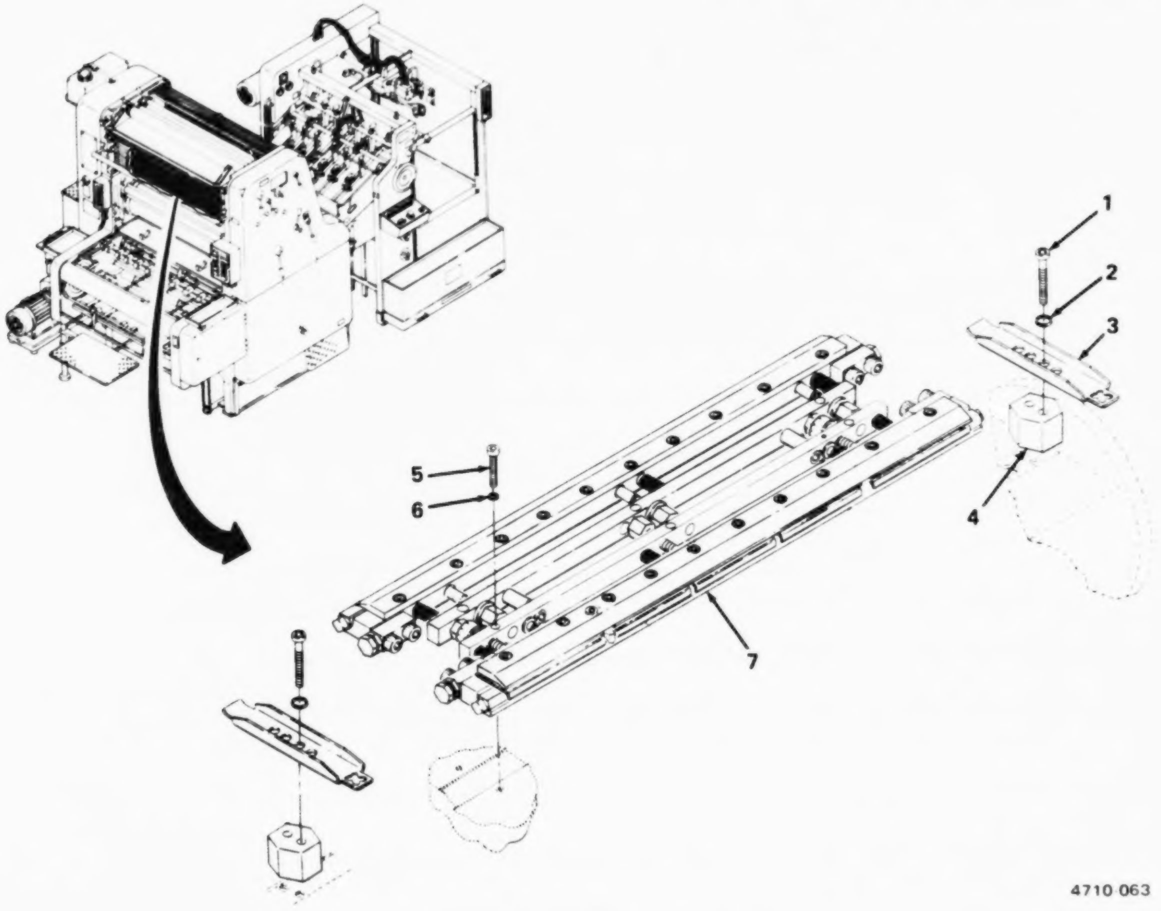
INITIAL SETUP

Tools	*Equipment Conditions*
6 mm hex key 17 mm combination wrench	Plate cylinder guard removed (TM 5-3610-286-10) Plexiglass guard covered with map stock or newspaper to keep it clean

a. *Remove.* (figure 2-94)

(1) Remove four socket-head screws (1), washers (2), two retainer bars (3), and two spacer blocks (4).

(2) Remove six socket-head screws (5), six washers (6), and clamp (7).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4710-063

Figure 2-94. Plate Clamp Removal.

2-46. Plate Clamp (cont).

b. Repair. (figure 2-95)

(1) Remove three hex nuts (1) and three washers (2).

(2) Separate tail edge clamp (3) from lead edge clamp (4) and support bars (5) and (6).

(3) Remove four socket-head screws (7), washers (8), two spacers (9), and support (5).

NOTE

The following procedure is for lead edge clamp. Procedure for repairing tail edge clamp is the same except for foils, micro adjustments and conical nuts, which are located only on lead edge clamp.

(4) Remove hex nut (10), washer (11), and two conical nuts (12).

(5) Remove three compression springs (13) and support bar (6).

(6) Remove ten socket-head screws (14), washers (15), clamping bar (16), and five positioning foils (17).

(7) Remove two micro adjusting screws (18), adjusting screw (19), and lock nut (20).

(8) Remove two set screws (21), adjusting knobs (22), and screw studs (23).

(9) Replace damaged or deformed positioning foils (17), stripped micro adjusting screws (18) or adjusting screw (19). Replace weak or broken compression springs (13).

(10) Replace two screw studs (23), adjusting knobs (22), and set screws (21).

(11) Replace adjusting screw (19), lock nut (20), and micro adjusting screws (18).

NOTE

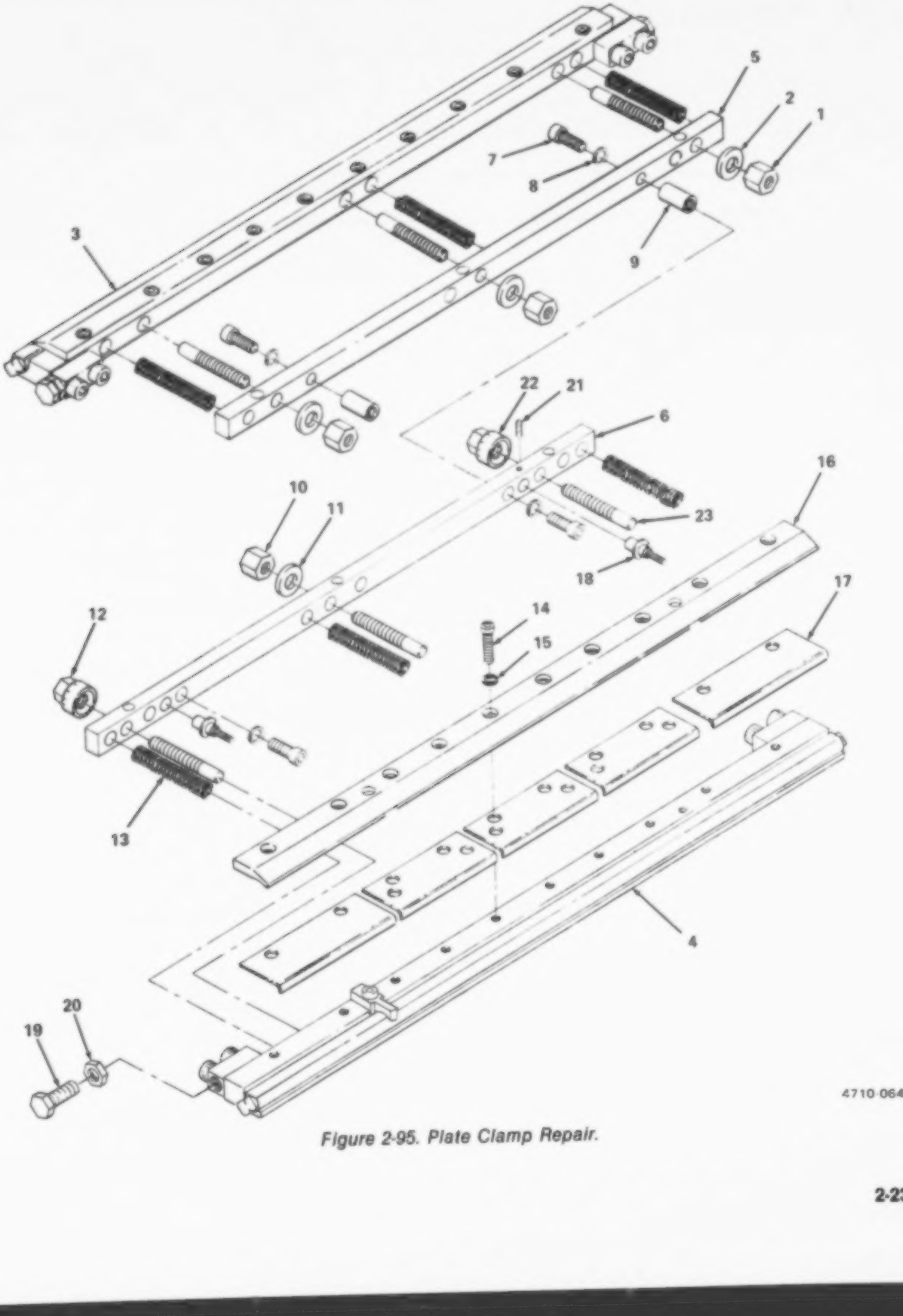
Two outer foils (17) have two holes and are longer than three inner foils.

(12) Replace five foils (17) on lead edge clamp (4) and replace clamping bar (16) and ten socket-head screws (14) and washers (15).

(13) Replace three compression springs (13) into support bar (6), and replace two conical nuts (12), hex nut (10) and washer (11).

(14) Assemble support bar (5) to support bar (6) by replacing four socket-head screws (7), washers (8), and two spacers (9).

(15) Assemble lead edge clamp (4) to tail edge clamp (3) and replace three hex nuts (1) and washers (2).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4710-064

Figure 2-95. Plate Clamp Repair.

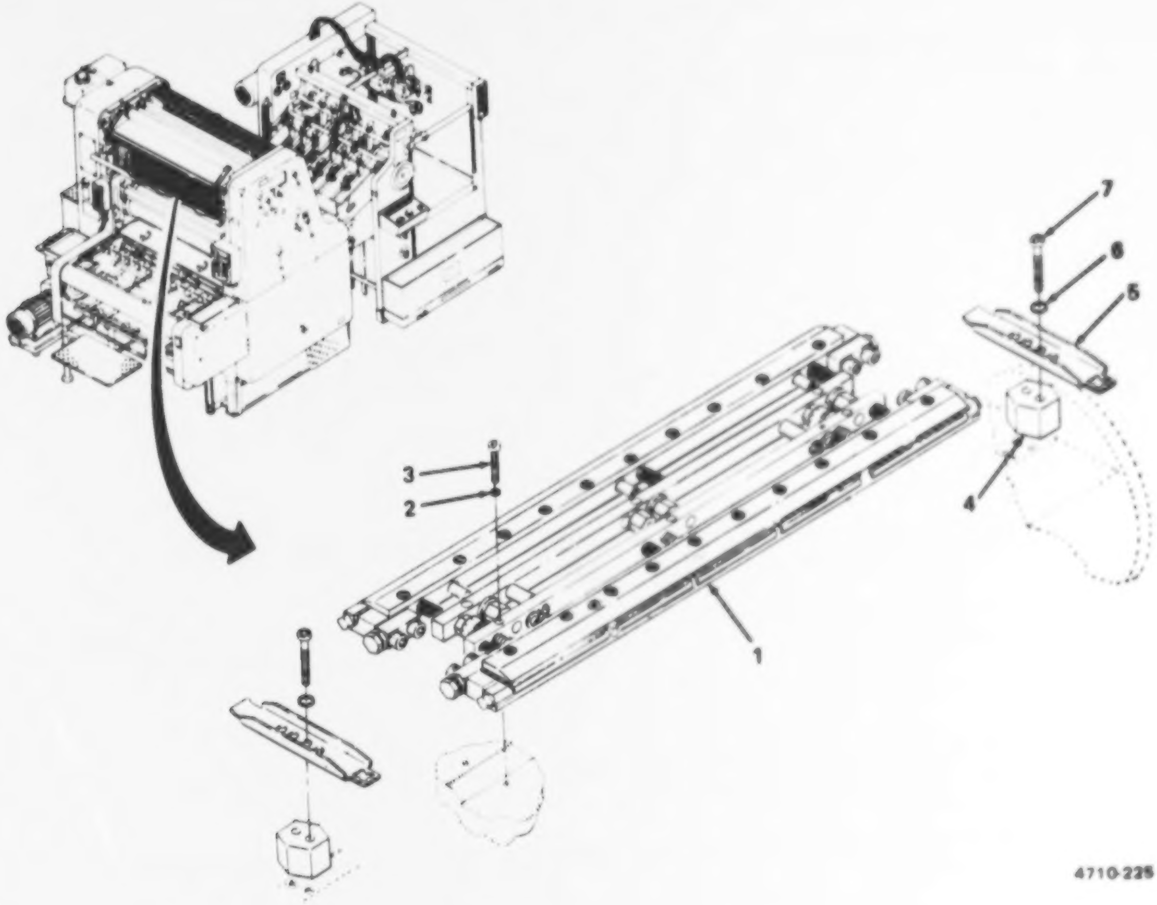
2-46. Plate Clamp (cont).

c. *Install.* (figure 2-96)

(1) Position clamp (1) and plate cylinder.

(2) Install six washers (2) and six socket-head screws (3).

(3) Install two spacer blocks (4), two retainer bars (5), four washers (6), and four socket-head screws (7).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4710-225

Figure 2-96. Plate Clamp Installation.

NOTE

FOLLOW-ON MAINTENANCE:
Replace plate cylinder guard (TM 5-3610-286-10).

2-47. Register Scope.

This task covers: a. Replace b. Adjust

INITIAL SETUP

Tools	*Equipment Conditions*
3 mm hex key	Plate cylinder guard removed (TM 5-3610-286-10)

a. *Replace.* (figure 2-97)

NOTE

Socket heads on socket-head mounting screws are filled with paint. Clean out paint before attempting to insert hex key.

(1) Remove two socket-head screws (1), two ribbed washers (2), two register scope brackets (3), and shims (4).

NOTE

There are two shims (normally) under each bracket. The 0.3 mm shim is mounted closest to the plate cylinder.

(2) Replace shims (4), two register scope brackets (3), ribbed washers (2), and two socket-head screws (1).

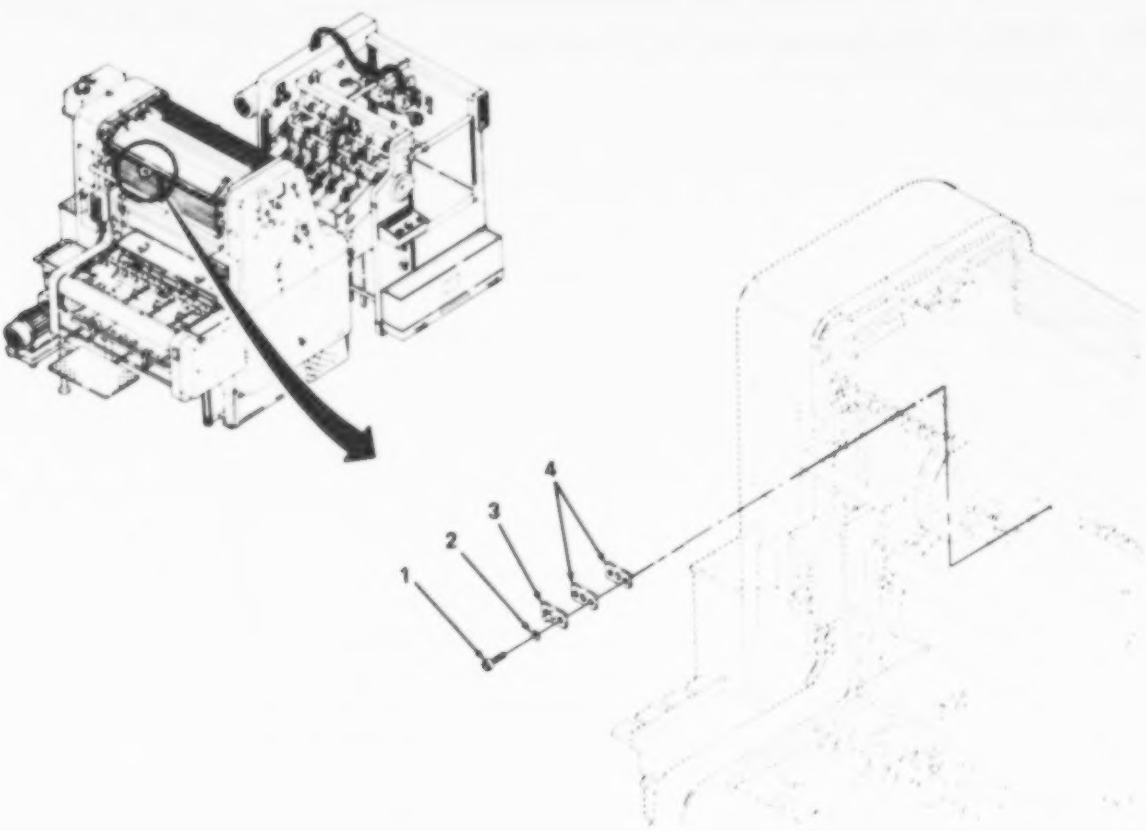


Figure 2-97. Register Scope Replacement.

b. Adjust. Remove or replace shims to adjust register scope bracket to be flush with plate cylinder surface.

NOTE

FOLLOW-ON MAINTENANCE:
Replace plate cylinder guard (TM 5-3610-286-10).

2-48. Suction Valve Housing Assembly and Motor.

This task covers: a. Test b. Remove c. Repair d. Install

INITIAL SETUP

Tools

6 mm combination wrench
13 mm combination wrench
6 mm hex key
0.050 x 0.375 x 8 in. flat-tip screwdriver
Multimeter

Additional Personnel Requirement

Electrician MOS 35E20

---

a. Test. (figure 2-98)

WARNING

> When working on high-voltage components, always have an additional person present, and keep one hand away from equipment to reduce hazard of current flowing through vital organs of body. Remove all jewelry from fingers, wrists, and neck prior to working on electrical components. Failure to do so may result in death or serious injury.

(1) Turn main power switch ON.

(2) Ensure red button (1) on switch motor electrical box is out and gray button (2) is in.

(3) Remove four screws (3) and cover (4).

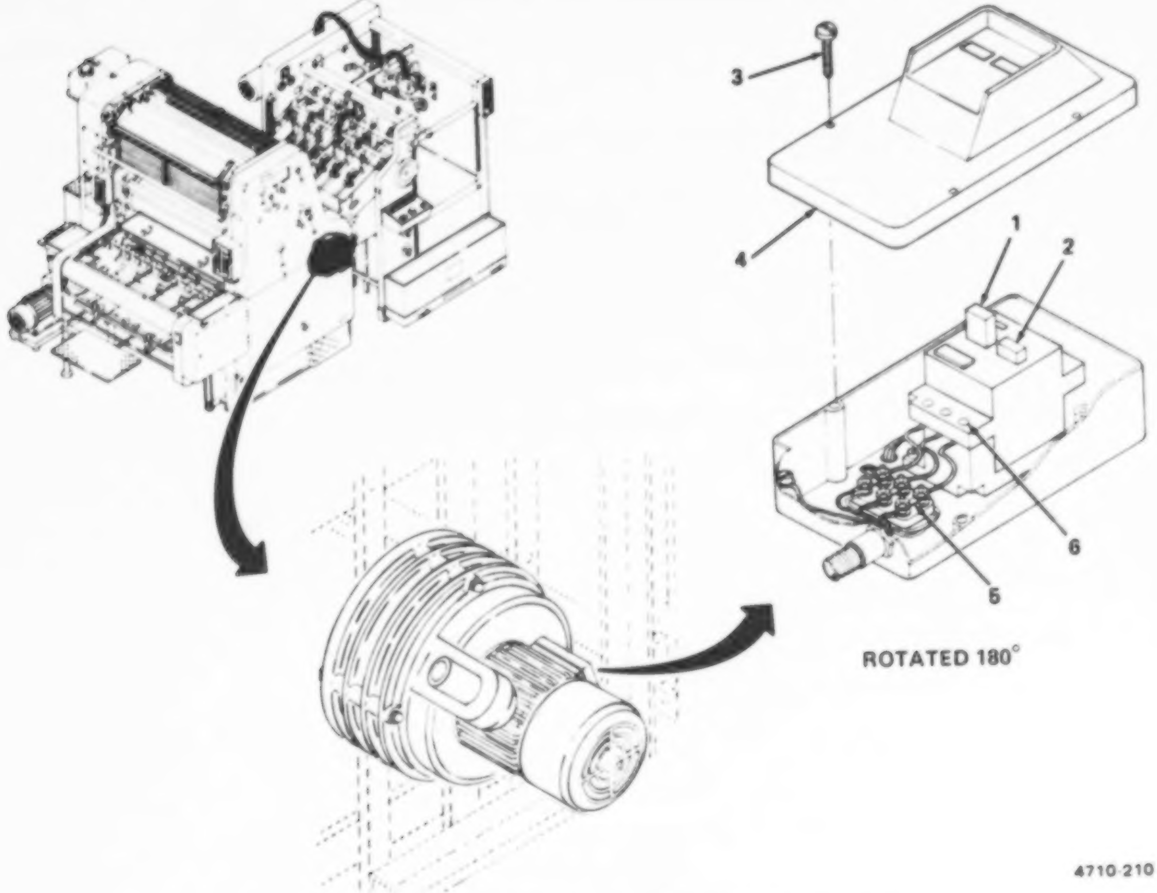
(4) Using a multimeter set to range higher than 220V ac, check for 220V ac between points L1 and L2, L1 and L3, and L2 and L3 on suction motor terminal strip (5).

(5) Replace suction motor if 220V ac is present, or go to step 4 if 220V ac is not present.

(6) Check for 220V ac between points T1 and T2, T1 and T3, and T2 and T3 on motor protection switch (6).

(7) Replace suction motor if 220V ac is present, or if 220V ac is not present, troubleshoot printing press circuits using schematic (figure FO-1).

(8) Turn main power switch OFF.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4710-210

Figure 2-98. Suction Valve Housing Assembly and Motor Test.

2-48. Suction Valve Housing Assembly and Motor (cont).

b. *Remove.*

(1) *Suction valve housing assembly.* (figure 2-99).

(a) Remove four lower hose clamps (1) and separate four hoses (2) from valve housing (3).

(b) Remove large hose (4) from valve housing (3) and pull other end of hose from suction motor.

(c) Remove hex-head cap screw (5), hex nut (6), and valve housing (3).

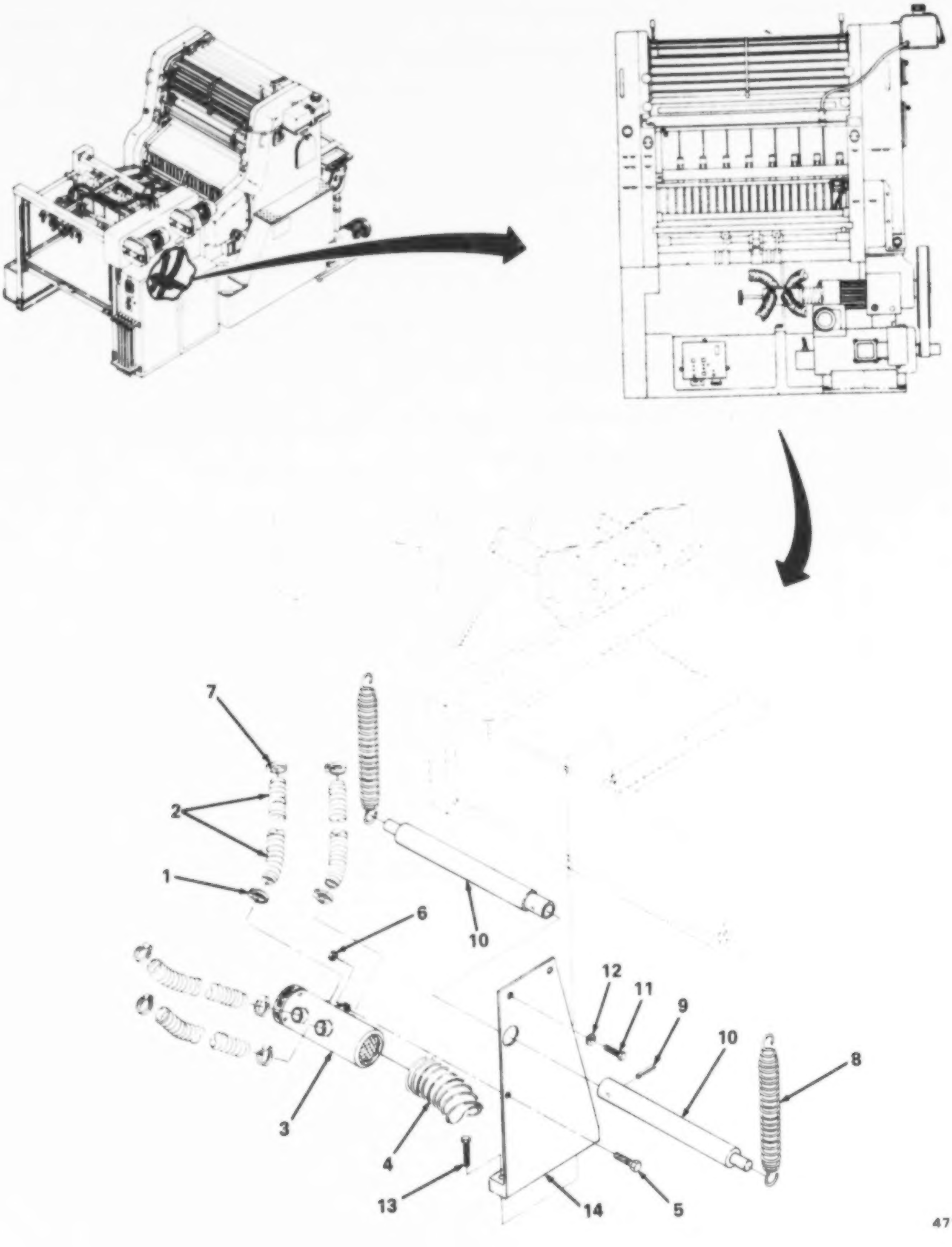
(d) Remove four upper hose clamps (7) and hoses (2).

(e) Remove two springs (8).

(f) Remove pin (9) and two bar halves (10).

(g) Remove two hex-head bolts (11) and washers (12).

(h) Remove two hex-head bolts (13) and valve housing support (14).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4710-107

Figure 2-99. Suction Valve Housing Assembly Removal.

2-48. Suction Valve Housing Assembly and Motor (cont).

(2) *Motor.* (figure 2-100)

(a) Remove five socket-head screws (1) and center sheet stop (2).

(b) Remove hose (3).

(c) Remove hex-head screw (4), washer (5), and lockwasher (6).

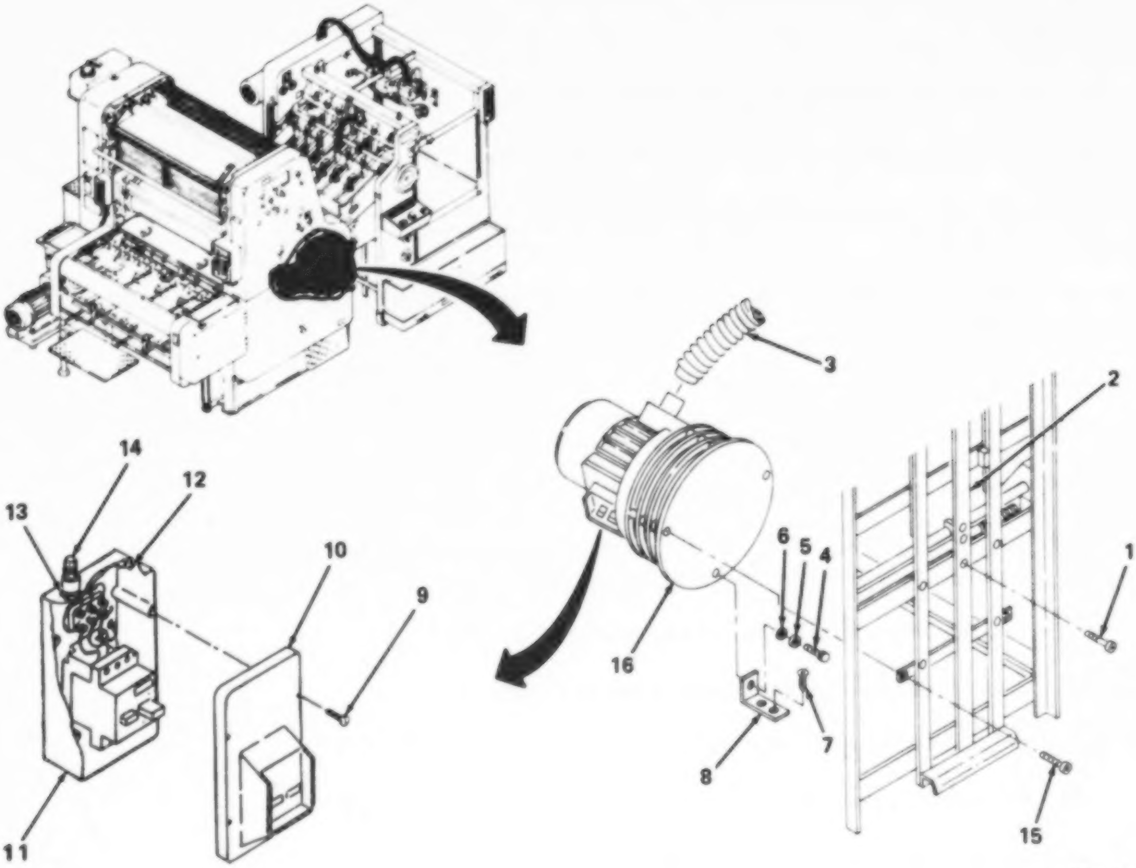
(d) Remove two cross-head screws (7) and angle bracket (8).

(e) Remove four machine screws (9) and cover (10) from electrical box (11).

(f) Remove ground wire (12) and three leads at points T1, T2, and T3.

(g) Loosen lock nut (13) and remove wire cable (14) from electrical box (11).

(h) Remove two hex-head screws (15) and remove motor (16).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4710-207

Figure 2-100. Motor Removal.

2-48. Suction Valve Housing Assembly and Motor (cont).

c. Repair.

(1) *Suction valve housing assembly.* (figure 2-101)

(a) Remove spring tension pin (1) and handwheel (2).

(b) Remove internal retaining ring (3) and pointer (4) and push shaft (5) through valve housing (6).

(c) Remove compression spring (7) from short pin (8). Remove spring tension pin (9) and separate shaft (5) from valve (10).

(d) Remove filter (11) from valve (10).

(e) Remove stop pin (12) and retaining ring (13).

(f) Remove three ribbed nails (14) and indicator plate (15).

(g) Replace damaged filter and weak or broken compression spring. Replace worn or unreadable indicator plate and broken or missing pointer.

(h) Replace three ribbed nails (14) and indicator plate (15).

(i) Replace stop pin (12) and retaining ring (13).

(j) Replace filter (11).

(k) Replace valve (10) on shaft (5) and replace spring tension pin (9).

(l) Replace compression spring (7) on shaft pin (8).

(m) Push shaft (5) through valve housing (6) until stopped by stop pin (12).

(n) Replace internal retaining ring (3).

(o) Replace pointer (4) on shaft (5).

(p) Replace handwheel (2) and spring tension pin (1).

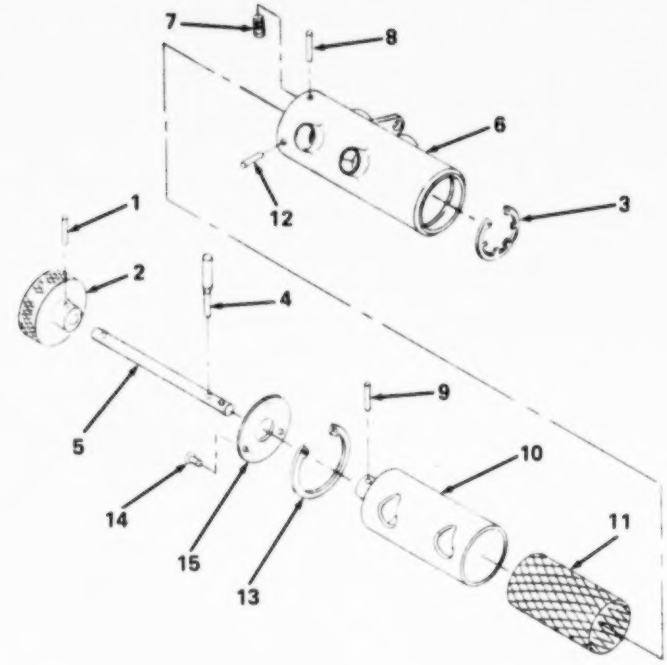
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Figure 2-101. Suction Valve Housing Assembly Repair.

2-48. Suction Valve Housing Assembly and Motor (cont).

(2) *Motor.* (figure 2-102)

(a) Remove six nuts (1) and washers (2).

(b) Remove cover (3) with filter (4).

(c) Wash filter with soapy water and shake dry.

(d) Replace cover (3) with filter (4).

(e) Replace six nuts (1) and washers (2).

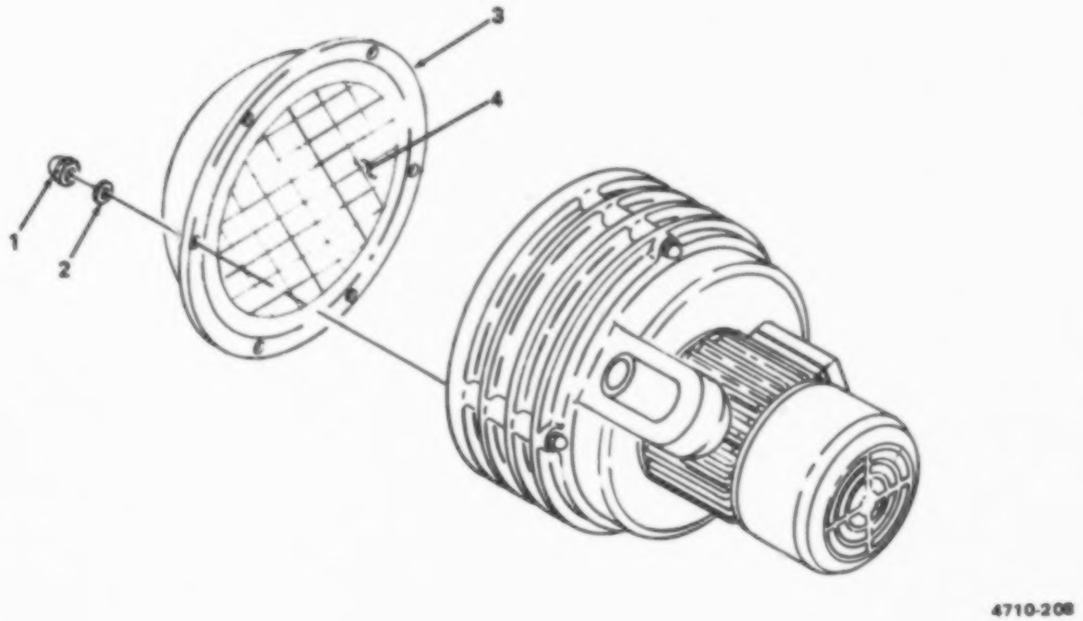


Figure 2-102. Motor Repair.

d. *Install.*

(1) *Motor.* (figure 2-103)

(a) Install motor (1) and two hex-head screws (2).

(b) Install wire cable (3) into electrical box (4) and tighten lock nut (5).

(c) Install three leads at points T1, T2, and T3 in electrical box (4) and ground wire (6).

(d) Install cover (7) and four machine screws (8) on electrical box (4).

(e) Install angle bracket (9) and two cross-head screws (10).

(f) Install washer (11), lockwasher (12) and hex-head screw (13) into motor (1).

(g) Install hose (14).

(h) Install center sheet stop (15) and five socket-head screws (16).

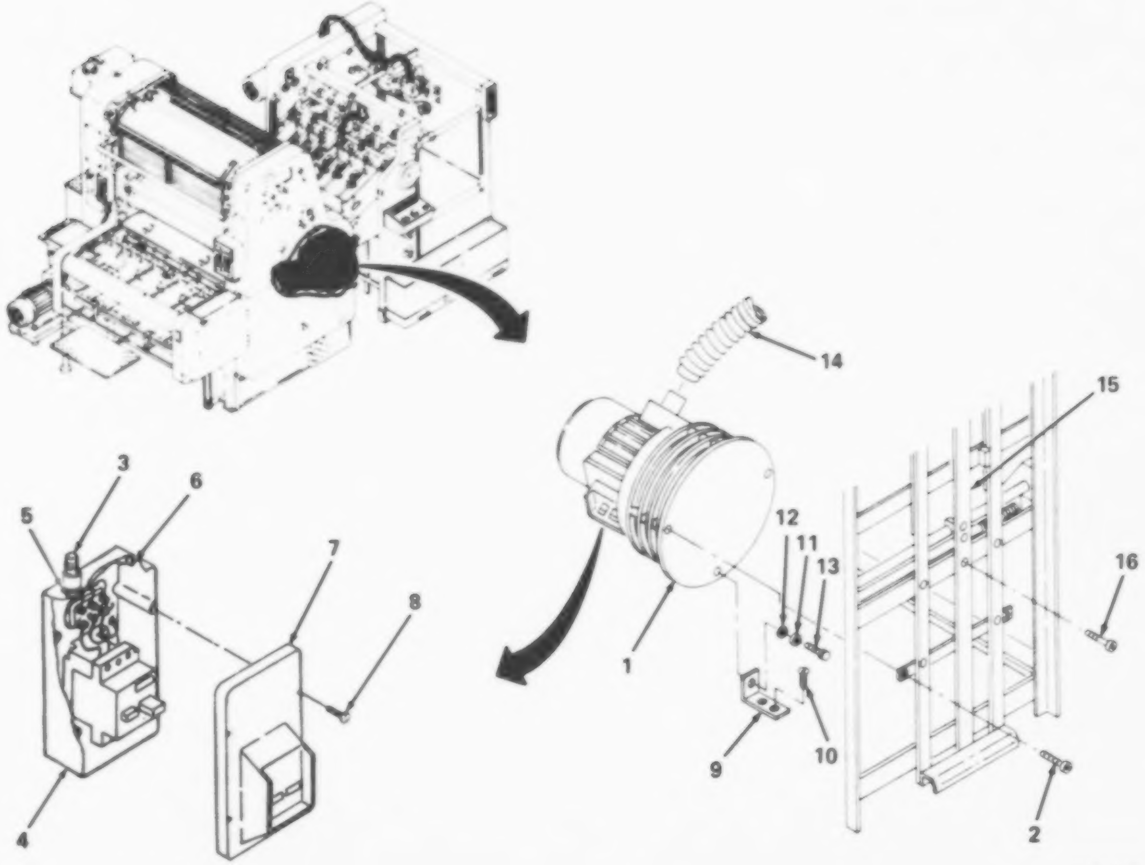


Figure 2-103. Motor Installation.

2-48. Suction Valve Housing Assembly and Motor (cont).

(2) *Suction valve housing assembly.* (figure 2-104)

(a) Install suction valve support (1) and two hex bolts (2).

(b) Install two washers (3) and two hex-head bolts (4).

(c) Install two bar halves (5) and pin (6).

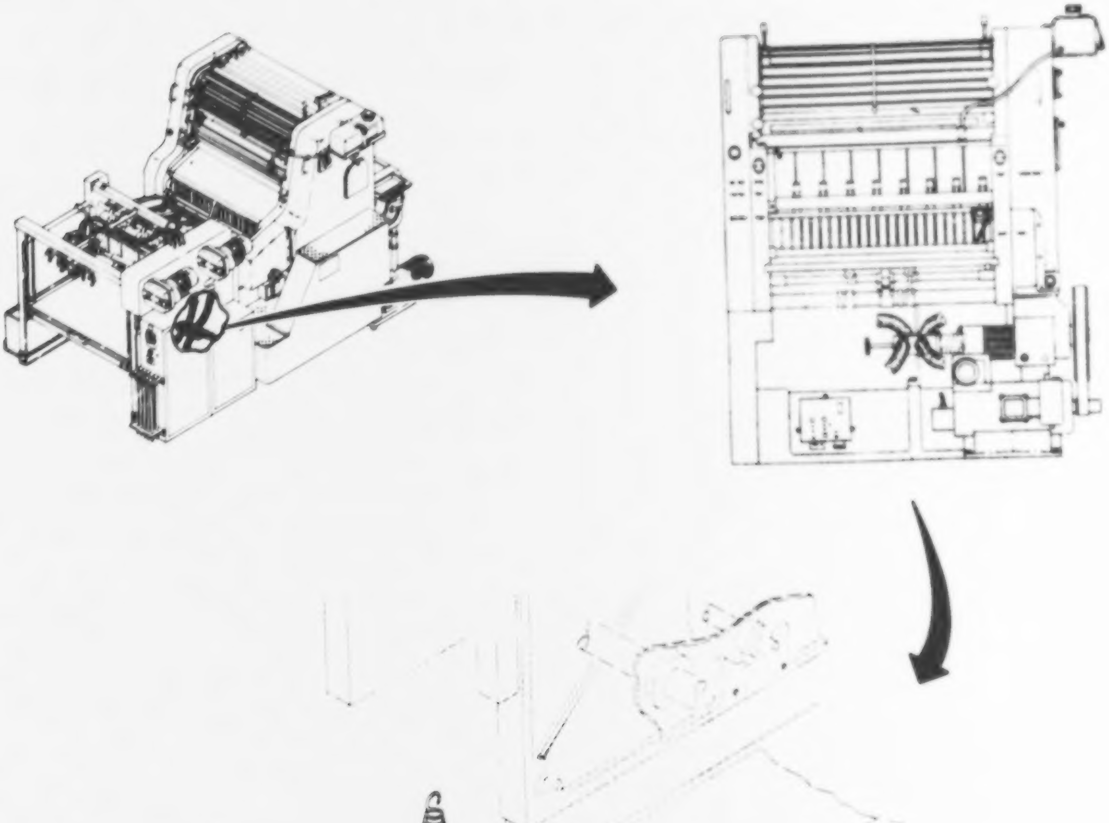
(d) Install two spring (7).

(e) Install four hoses (8) and upper hose clamps (9).

(f) Install valve housing (10), hex-head cap screw (11) and hex nut (12).

(g) Install large hose (13) in valve housing (10) and attach other end of hose to suction motor.

(h) Install four hoses (8) and lower hose clamps (14) on valve housing (10).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4710-227

Figure 2-104. Suction Valve Housing Assembly Installation.

2-49. Pull Side Lay Assembly.

This task covers:	a. Service	c. Inspect	e. Install
	b. Remove	d. Repair	f. Adjust

INITIAL SETUP

Tools

3 mm hex key
5 mm hex key
6 mm hex key
8 mm combination wrench
10 mm combination wrench
13 mm combination wrench
5 mm pin punch
Ball-peen hammer

Tools (cont)

Stud set remover
0.050 x 0.375 x 8 in. flat-tip screwdriver
Retaining-ring pliers
Feeler gage

Equipment Conditions

Lubrication distribution unit removed (para. 2-78)

a. Service.

WARNING

CLEANING SOLVENT. Lithographic solvent is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat. If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

(1) Clean dirty pull wheels with solvent.

(2) Adjust pull wheels (TM 5-3610-286-10).

b. Remove. (figure 2-105)

NOTE

Set adjustment knobs to "0". Measure the gap with feeler gage and record before removing.

(1) Remove two screws (1) and pointer (2).

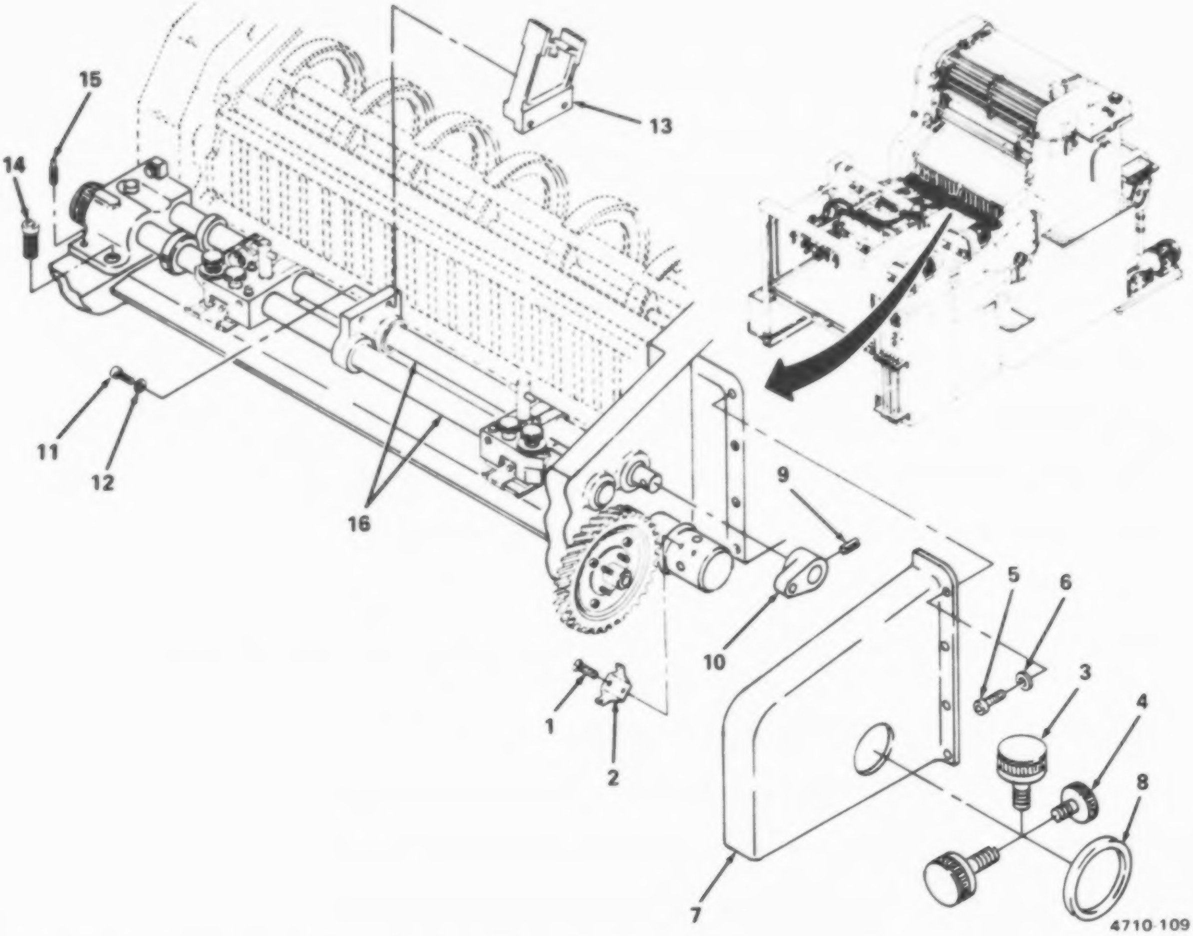
(2) Remove two adjustment knobs (3), knurled screw (4), socket-head screws (5), washers (6), register feed guard (7), and V-ring (8).

(3) Remove pin (9) and allow lever (10) to swing free.

(4) Remove two socket-head screws (11), washers (12), and support piece (13).

(5) Remove two socket-head screws (14) and threaded taper pin (15).

(6) Slightly raise O/S end of assembly and slide shafts (16) out of D/S side frame.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4710-109

Figure 2-105. Pull Side Lay Assembly Replacement.

2-49. Pull Side Lay Assembly (cont).

c. *Inspect.* Inspect pull wheels in side guides for binding, due to dirt or damage, which could cause register problems.

d. *Repair.* (figure 2-106)

(1) Remove retaining ring (1), washer (2), and collar (3).

(2) Remove hex-head screw (4), washer (5), and adjustment disk (6).

(3) Slide bearing (7) off shafts (8) and (9).

(4) Remove compression spring (10).

(5) Remove spring tension pin (11) and set collar (12).

(6) Loosen set screws (13) and remove two set collars (14).

(7) Remove two stop pins (15).

(8) Loosen tommy bar (16) and slide O/S side guide (17) off shafts (8, 9).

(9) Remove spring tension pin (18) and slide bracket (19) off shafts (8, 9).

(10) Loosen tommy bar (20) and slide D/S side guide (21) off shafts (8, 9).

(11) Remove two rivets (22) and indicator plate (23).

(12) Replace weak or broken spring (10) and unreadable or worn indicator plate (23). Replace damaged side guides (17, 21) and clogged lubrication fitting (24).

(13) Replace indicator plate (23) and two rivets (22).

(14) Replace D/S side guide (21) on shafts (8, 9) and tighten tommy bar (20).

(15) Replace bracket (19) on shafts (8, 9) and replace spring tension pin (18).

(16) Replace O/S side guide (17) on shafts (8, 9) and tighten tommy bar (16).

(17) Replace two stop pins (15).

(18) Replace two set collars (14) and tighten set screws (13).

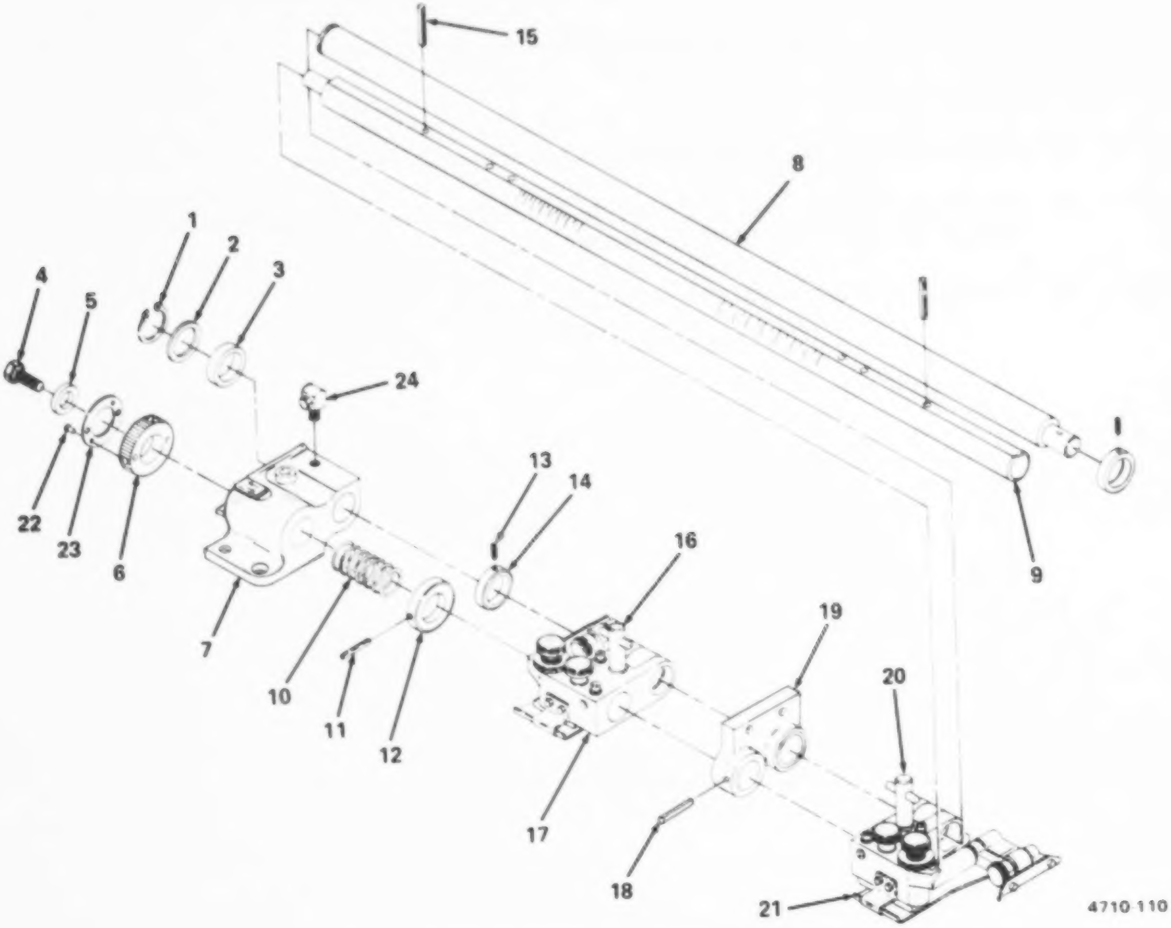
(19) Replace collar (12) and spring tension pin (11).

(20) Replace compression spring (10).

(21) Replace bearing (7) onto shafts (8) and (9).

(22) Replace adjustment disk (6), washer (5), and hex-head screw (4).

(23) Install collar (3), washer (2), and retaining ring (1).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4710-110

Figure 2-106. Pull Side Lay Assembly Repair.

2-49. Pull Side Lay Assembly (cont).

e. *Install*. (figure 2-107)

(1) Slightly raise O/S end of assembly and slide shafts (1) into D/S side frame.

(2) Install threaded taper pin (2) and two socket-head screws (3).

(3) Install lever (4) and pin (5).

(4) Install support piece (6), two washers (7), and two socket-head screws (8).

(5) Install register feed guard (9), V-ring (10), washers (11), socket-head screws (12), knurled screw (13), and two adjustment knobs (14).

(6) Install pointer (15) and two screws (16).

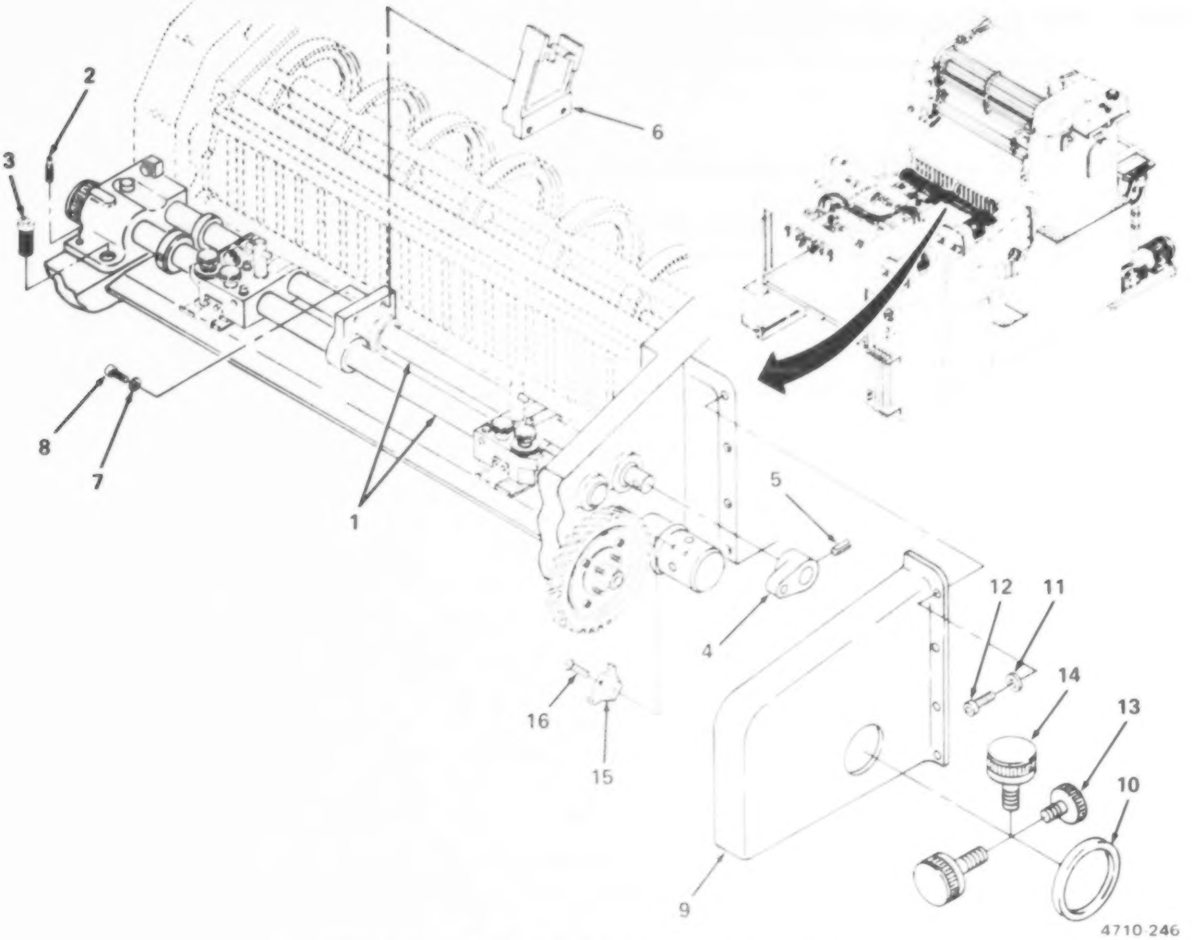
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Figure 2-107. Pull Side Lay Assembly Installation.

2-49. Pull Side Lay Assembly (cont).

f. *Adjust.* (figure 2-108)

(1) Set up graduated disc for timing-adjustment measurements (para 2-96).

(2) Unpin pull side lay cam (1) (located behind pinion gear (2) on D/S side plate) and remove four socket-head screws (3) from gear (2).

(3) Rotate cam until pull wheels rise off pull rail and go up at a reading of 83° 30' to 84° on the graduated disc.

(4) Check clearance to side lay cover of 0.1 m m.

(5) Repair cam (1) and replace four socket-head screws (3) in gear (2).

(6) Remove graduated disc (para. 2-98).

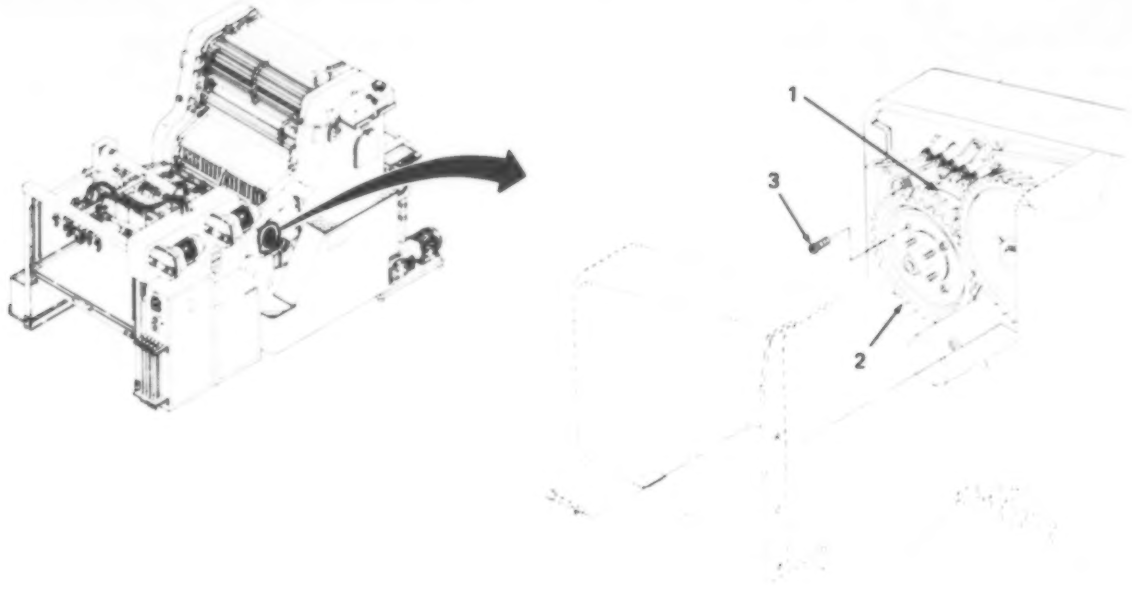


Figure 2-108. Pull Side Lay Adjustment.

NOTE

FOLLOW-ON MAINTENANCE:
Install lubrication distribution unit (para. 2-78).

2-50. Pull Rail Assembly.

This task covers: a. Remove b. Repair c. Install d. Adjust

INITIAL SETUP

Tools	*Equipment Conditions*
5 mm hex key 6 mm hex key 7 mm combination wrench	Pull side lay assembly removed (para. 2-49)

a. Remove. (figure 2-109)

(1) Remove two socket-head screws (1), two spacers (2) and two sheet stop fingers (3).

(2) Remove four socket-head screws (4) and two transfer gripper guards (5).

(3) Remove 20 socket-head screws (6) and feed table (7).

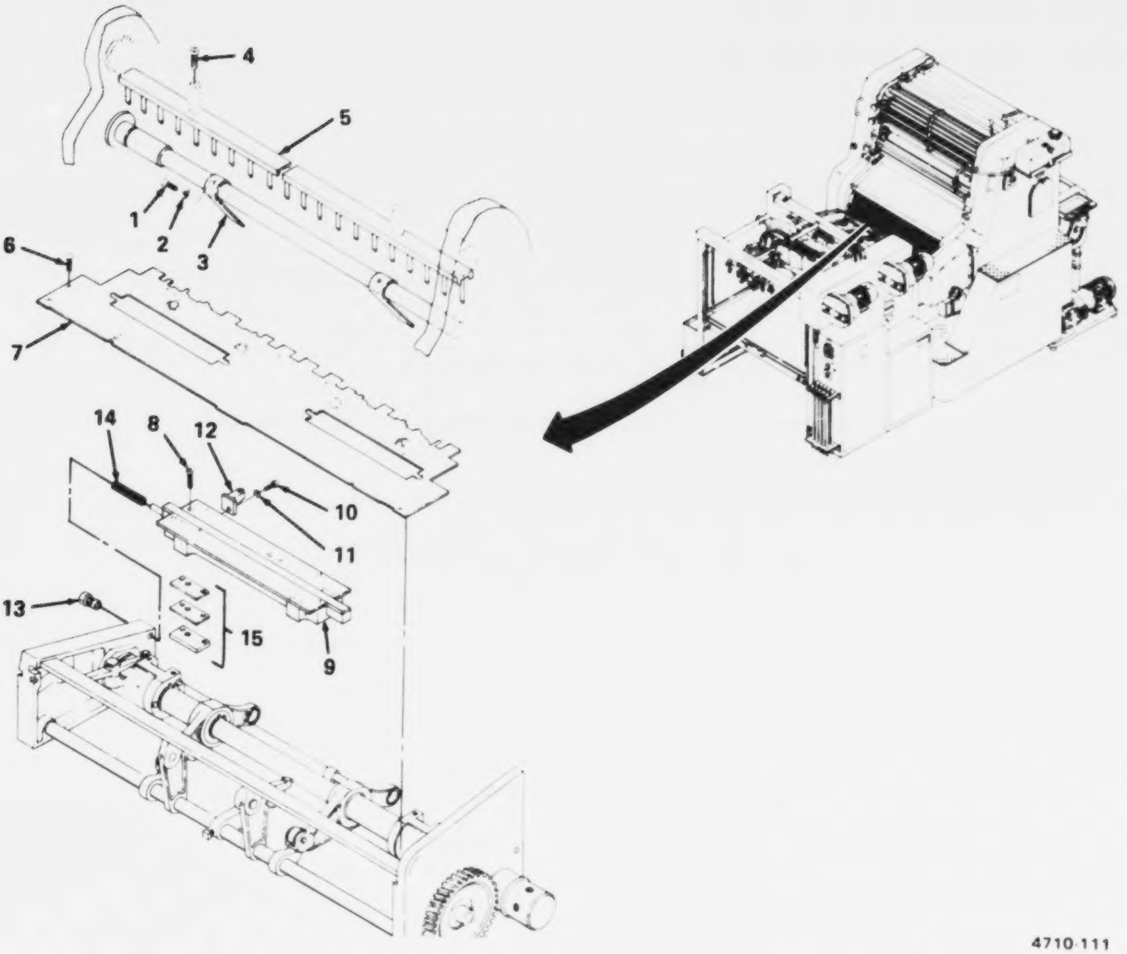
(4) Remove eight socket-head screws (8) and two guide pieces (9).

NOTE

The following steps are for only one pull rail assembly.

(5) Remove socket-head screw (10), washer (11) and support (12).

(6) Remove bolt (13), compression spring (14), and shims (15).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4710-111

Figure 2-109. Pull Rail Assembly Removal.

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2-50. Pull Rail Assembly (cont).

c. *Repair.* (figure 2-110)

(1) Remove two socket-head screws (1), two hex nuts (2), two washers (3), bar (4), and shims (5).

(2) Remove two socket-head screws (6), washers (7), hex nuts (8), washers (9), bar (10), and shims (5).

(3) Remove four socket-head screws (11) and two bars (12).

(4) Remove pull rail holder (13), socket-head screw (14), pull rail (15), spring pin (16), and ball bearing (17).

(5) Remove six caged needle bearings (18) from guide piece (19).

(6) Replace worn or grit contaminated bearings, any cracked, broken, dented, distorted, or otherwise unserviceable items.

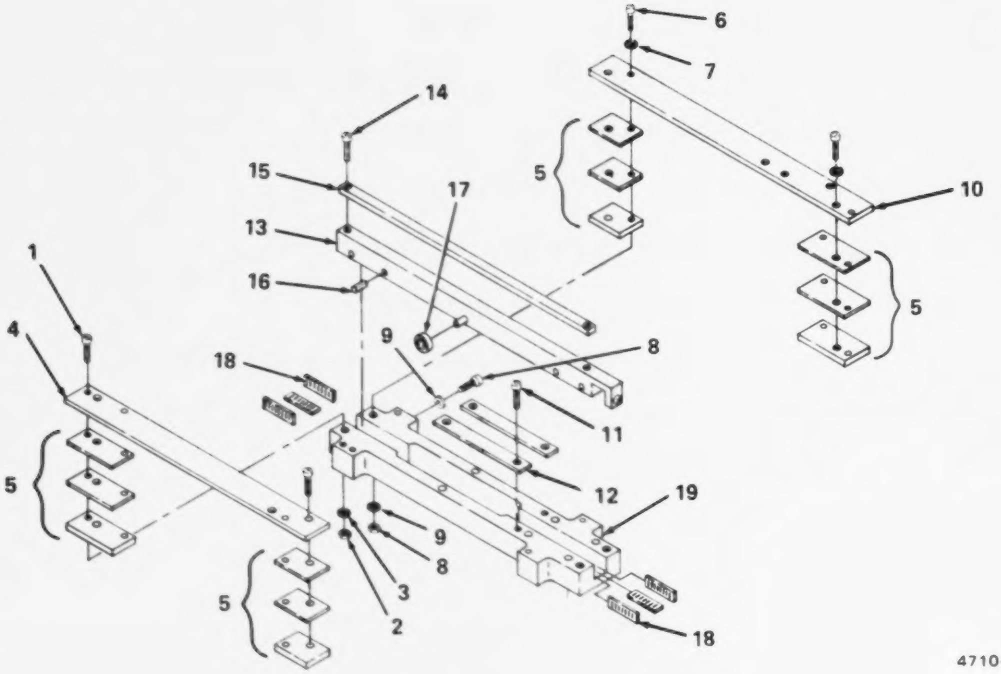
(7) Assemble pull rail holder (13), pull rail (15), socket-head screw (14), spring pin (16), and ball bearing (17).

(8) Install six caged needle bearings (18) and rail holder (13) in guide piece (19).

(9) Install two bars (12) and four socket-head screws (11).

(10) Install shims (5), bar (10), two washers (9), hex nuts (8), washers (7), and socket-head screws (6).

(11) Install shims (5), bar (4), two washers (3), hex nut (2), and socket-head screws (1).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4710-112

Figure 2-110. Pull Rail Assembly Repair.

2-50. Pull Rail Assembly (cont).

c. *Install.* (figure 2-111)

NOTE

Steps (1) and (2) are for only one of the pull rail assemblies.

(1) Install shims (1), compression spring (2), and bolt (3).

(2) Install support (4), washer (5), and socket-head screw (6).

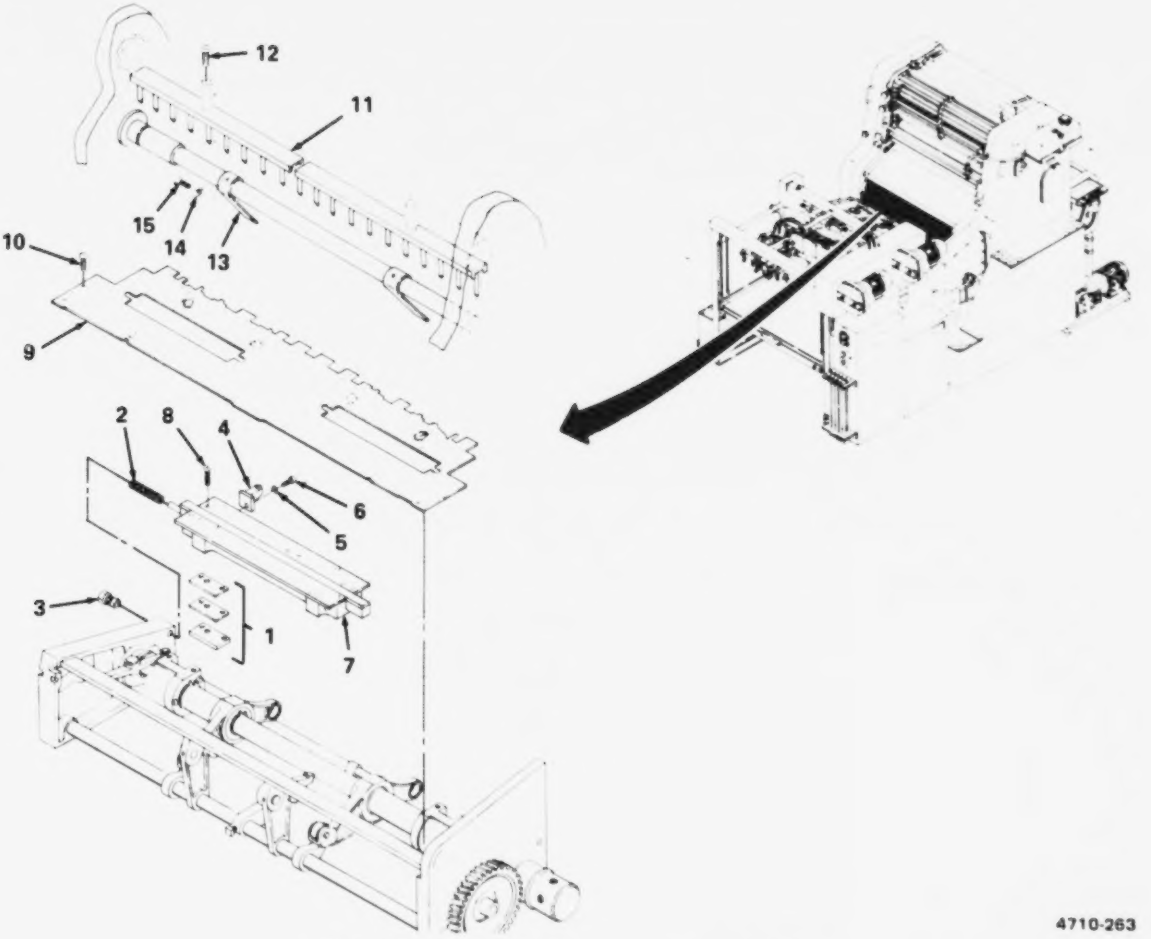
(3) Install two guide pieces (7) and eight socket-head screws (8).

(4) Install feed table (9) and 20 socket-head screws (10).

(5) Install two transfer gripper guards (11) and four socket-head screws (12).

(6) Install two sheet stop fingers (13), two spacers (14), and two socket-head screws (15).

(7) Check and adjust pull rail height as required.


12
11
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9
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4
6
5
3
1
7
4710-263

Figure 2-111. Pull Rail Assembly Installation.

2-50. Pull Rail Assembly (cont).

a. *Adjust.*

(1) *Pull rail height.*

(a) Pull rails have to be set flush with feed table or exactly 0.05 mm above feed table.

(b) Adjust height by placing or removing shims under guide rails (see figure 2-111 and installation procedure b). Shims sizes are as follows: 0.025, .05, and .10.

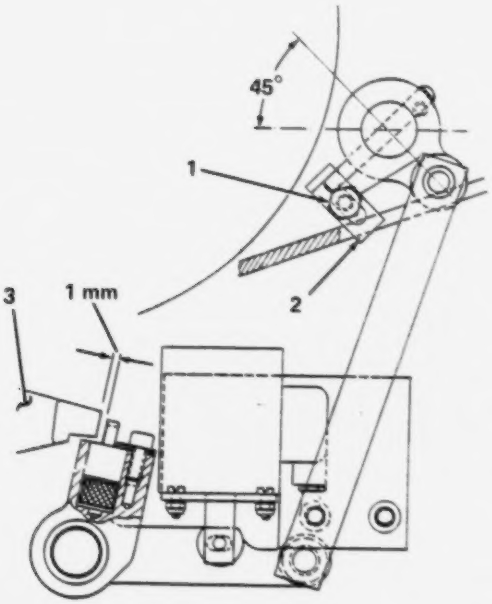
(c) Set height of support bars, placing or removing shims under support bars (see figure 110 and repair procedure c). Magnet plates on support bars must be exactly flush with feed table.

(2) *Stop finger to feed table clearance.*

(a) *Electromagnetic switch trip lever.* (figure 2-112)

1 With stop fingers disengaged, loosen nut (1) on stop angle (2).

2 Adjust stop angle (2) so that, through linkage, there is a 1 mm gap at the electromagnetic switch trip lever (3).



4710-264

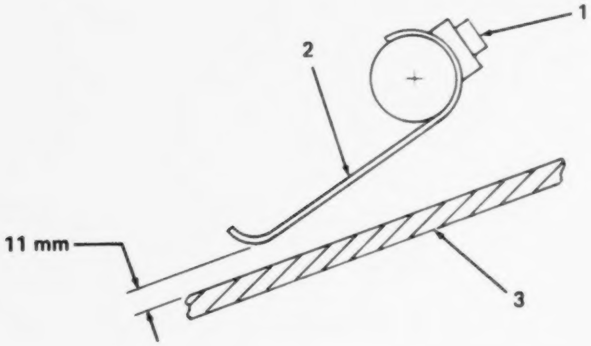
Figure 2-112. Electromagnetic Switch Trip Lever Adjustment.

(b) *Stop finger clearance.* (figure 2-113)

1 Loosen socket-head screws (1) on each stop finger (2).

2 Adjust the stop fingers for 11 mm clearance to the feed table (3).

3 Tighten socket-head screws (1).



4710-265

Figure 2-113. Stop Finger to Feed Table Adjustment.

NOTE

FOLLOW-ON MAINTENANCE:
Install pull side lay assembly (para. 2-49).

2-51. Shaft Assembly.

This task covers: Repair

INITIAL SETUP

Tools

Feeler gage
4 mm hex key
6 mm combination wrench
Flat-tip screwdriver

NOTE

Repair of the shaft assembly at the organizational level is limited to adjusting knobs and associated hardware.

Repair. (figure 2-114)

NOTE

Set adjustment knobs to "0". Measure gap between the bottom of knobs and top of adjuster and record before repairing.

(1) Remove pan-head screw (1), pointer (2), and shim plate (3).

(2) Remove knurled locking screw (4).

(3) Remove two adjustment knobs (5).

(4) Remove V-ring (6).

(5) Remove socket-head screw (7), washer (8), and compression spring (9).

(6) Remove slotted screw (10) and washer (11).

(7) Remove three rivets (12), indicator plate (13), and set screw (14).

(8) Replace worn indicator plate (13), weak or broken spring (9), stripped adjustment knobs (5), and damaged pointer (2).

(9) Replace set screw (14), indicator plate (13), and three rivets (12).

(10) Replace washer (11) and slotted screw (10).

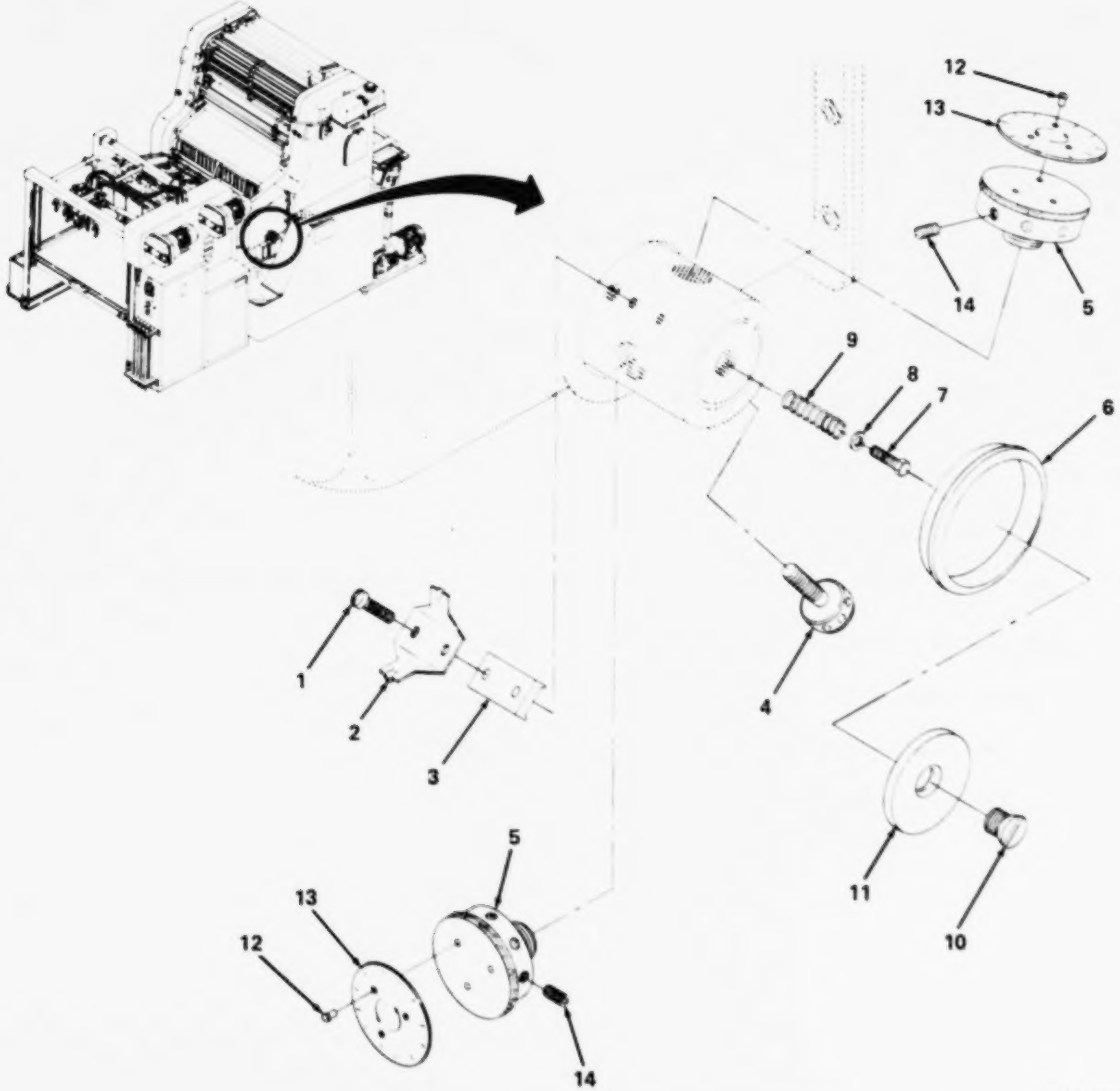
(11) Replace compression spring (9), washer (8), and socket-head screw (7).

(12) Replace V-ring (6).

(13) Replace two adjustment knobs (5).

(14) Replace knurled locking screw (4).

(15) Replace shim plate (3), pointer (2), and pan-head screw (1).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5
13
12
14
4710-114

Figure 2-114. Register Adjusting Shaft Repair.

2-52. Front Lay Assembly.

This task covers: a Replace b. Repair c. Adjust

INITIAL SETUP

Tools

8 mm combination wrench
10 mm combination wrench
13 mm combination wrench
5 mm hex key
8 mm hex key
Feeler gage

a. *Replace*. (figure 2-115)

(1) Remove socket-head screw (1) and lay cover plate (2).

(2) Remove two socket-head screws (3), washers (4), two hex-head screws (5), and front guide (6).

(3) Remove springs (7), clip (8), washer (9), and pin (10).

(4) Install pin (10), washer (9), and clip (8).

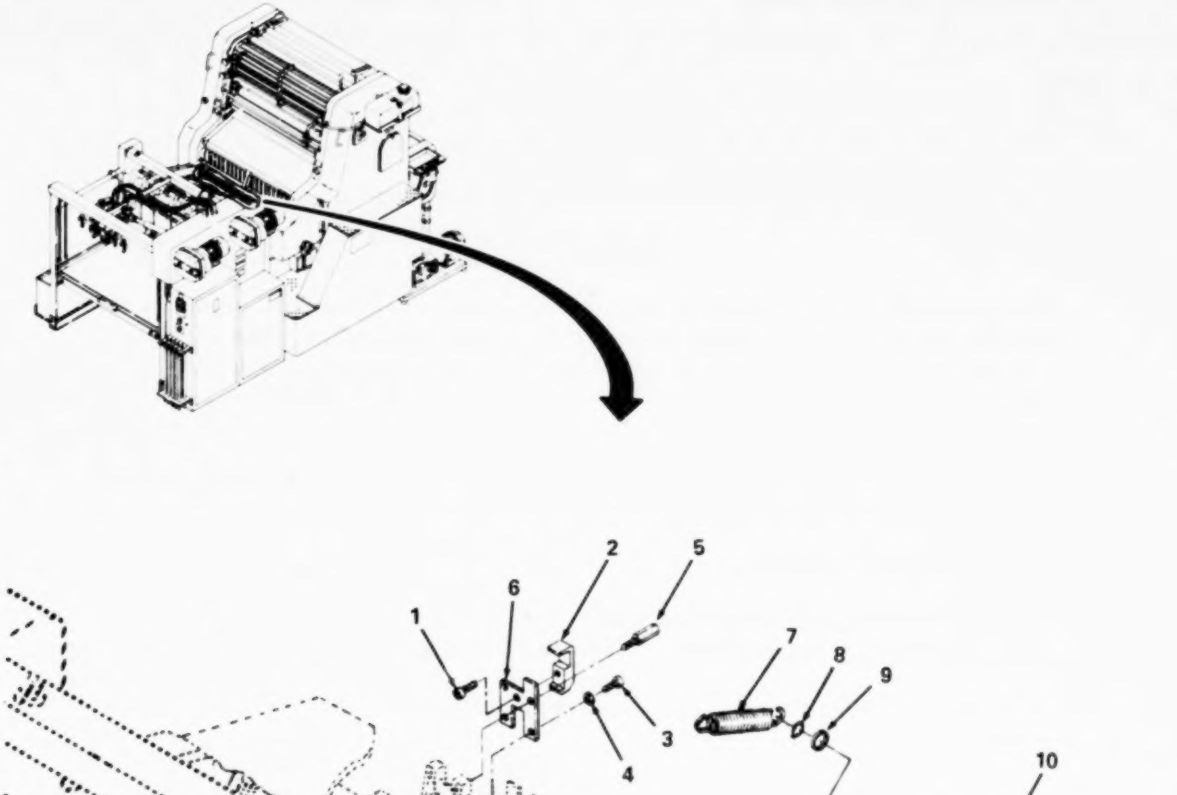
(5) Install front guide (6), two hex screws (5), washers (4), and socket-head screws (3).

(6) Install cover plate (2) and socket-head screws (1).

b. *Repair*. (figure 2-115)

(1) Replace damaged lay cover plate (2) and front guide (6).

(2) Replace broken or weak springs (7).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9
10
4710-115

Figure 2-115. Front Lay Replacement.

2-52. Front Lay Assembly (cont).

c. *Adjust.*

(1) *Front lay height adjustment.* (figure 2-116)

(a) Set front lay height adjustment screws (D/S) and (O/S) to zero.

WARNING

When working on high-voltage components, always have an additional person present, and keep one hand away from equipment to reduce hazard of current flowing through vital organs of body. Remove all jewelry from fingers, wrists, and neck prior to working on electrical components. Failure to do so may result in death or serious burns.

(b) With main power switch ON, take printing press off safe and inch until front lays (1) are in their lowest position over feeder table (2).

(c) Put printing press on safe.

(d) Insert 0.10 mm feeler gage between front lays (1) and feeder table (2) and check that it is snug in front lay. If snug, no adjustment is needed. If not, go to step (e).

(e) Take printing press off safe and inch until socket-head screw (3) is accessible. Loosen screw.

(f) Put printing press on safe and loosen socket-head screw (3).

(g) Lift front lay (1) to highest position over feeder table (2).

(h) Finger tighten socket-head screw (3).

(i) Take printing press off safe and inch until front lays are again in their lowest position.

(j) Put printing press on safe.

(k) Insert 0.10 mm feeler gage under front lay (1) and adjust front lay down until feeler gage can be pulled out with slight drag.

NOTE

If feeler gage cannot be inserted, go to step (o).

(l) Take printing press off safe and inch until socket-head screw (3) is accessible.

(m) Tighten socket-head screw (3).

(n) Recheck feeler gage adjustment. If too loose or too tight, repeat steps (e) through (m).

(o) Loosen three bearing screws located under feeder table and adjust so that feeler gage can be inserted between head stop and feeder table.

(p) Tighten screws and adjust by performing steps (k) through (m).

NOTE

All front lays must be in a straight line. However, the two middle front lays may be set back a little behind the other two lays. The middle front lays must not protrude ahead of the other lays since this would make the sheet wobble and thus cause register differences.

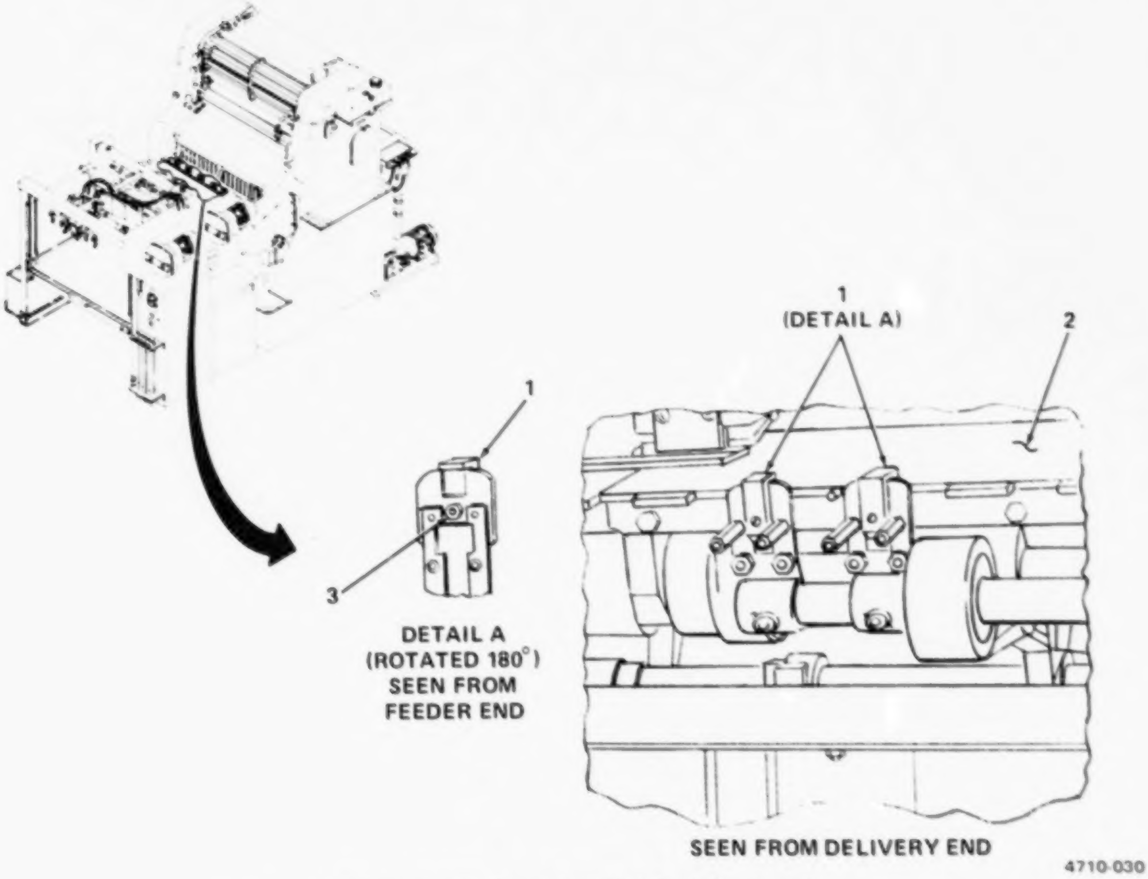

1
(DETAIL A)
2
1
3
DETAIL A
(ROTATED 180°)
SEEN FROM
FEEDER END
SEEN FROM DELIVERY END
4710-030

Figure 2-116. Front Lay Height Adjustment.

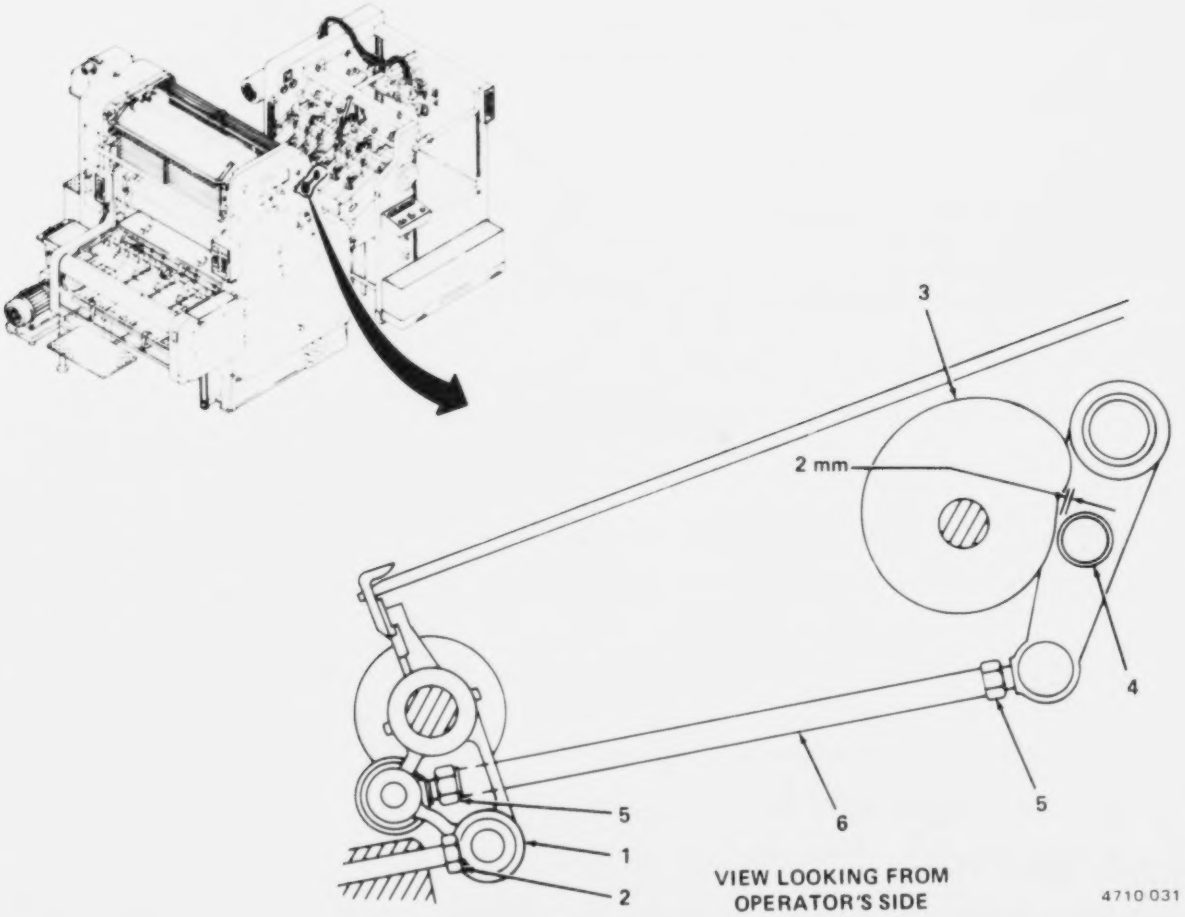
2-52. Front Lay Assembly (cont).

(2) *Front lay to ranger drum adjustment.* (figure 2-117)

(a) When the ranger drum gripper bite is set correctly (large gripper margin: 6 mm, small gripper margin: 4 mm), roller (1) has to be resting against the stop screw (2) from when the front lays are going down until they swing off.

(b) With grippers in position of maximum gripper margin, check that there is 0.02 mm clearance between cam (3) and roller (4) when roller (1) is resting against stop screw (2). If not, go to step c.

(c) Loosen lock nuts (5) and adjust length of rod (6) to obtain 0.02 mm clearance between cam (3) and roller (4).


3
2 mm
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5
6
5
1
2
VIEW LOOKING FROM
OPERATOR'S SIDE
4710 031

Figure 2-117. Front Lay to Ranger Drum Adjustment.

2-53. Dust Catcher Assembly.

This task covers: a. Replace b. Repair

INITIAL SETUP

Tools

0.050 x 0.375 x 8 in. flat-tip screwdriver
10 mm combination wrench
30 mm combination wrench

a. *Replace.* (figure 2-118)

(1) Unlatch four clamps (1) and remove dust catcher (2).

(2) Remove filter cartridge (3) and two gaskets (4).

(3) Loosen hose clamps (5) and remove hoses (6).

(4) Remove four slotted-head screws (7), four nuts (8), bracket (9), and dust catcher housing (10).

(5) Install dust catcher housing (10), bracket (9), four nuts (8), and four slotted-head screws (7).

(6) Install hoses (6) and tighten hose clamps (5).

(7) Install two gaskets (4) and filter cartridge (3).

(8) Install dust catcher (2) and latch four clamps (1).

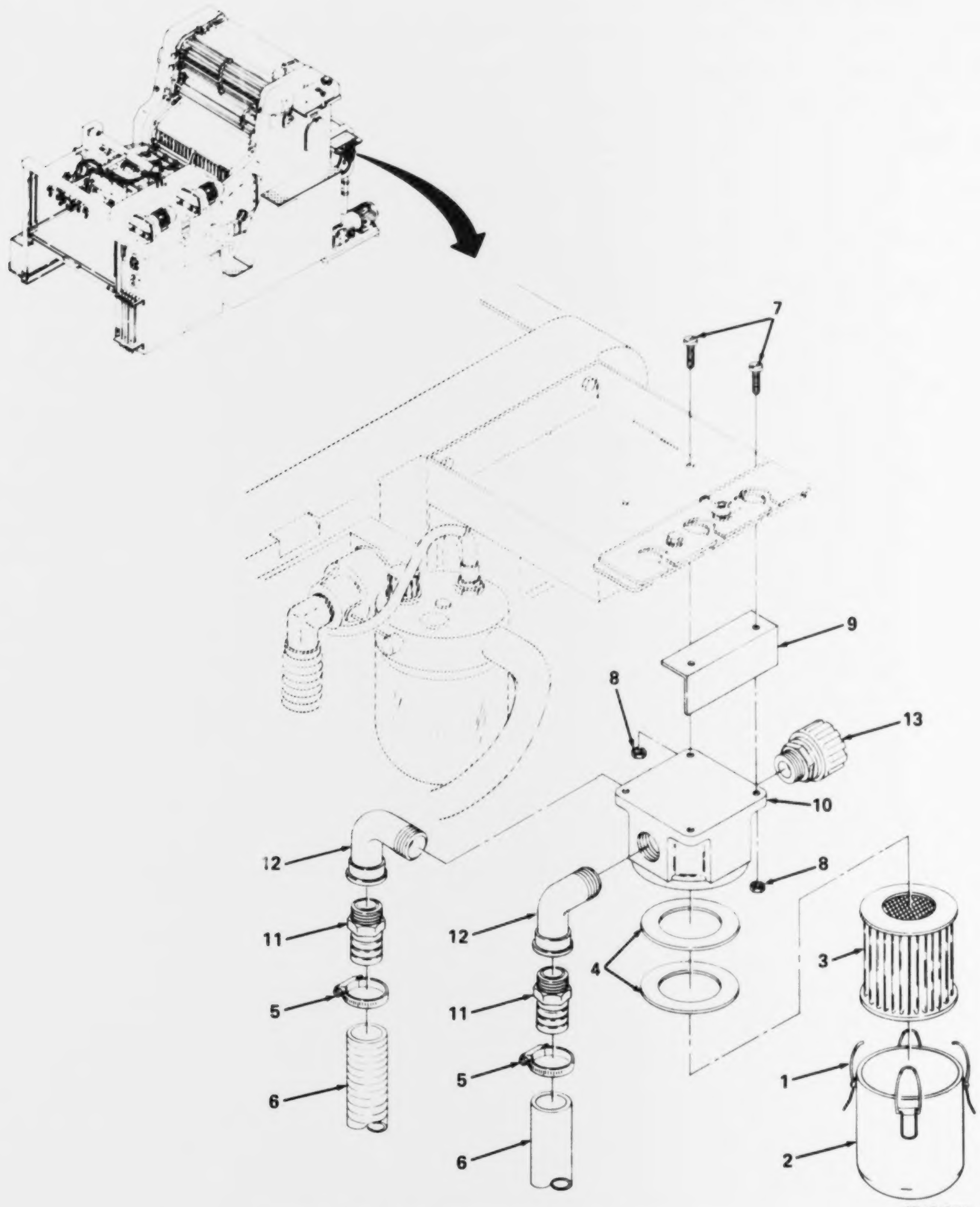
b. *Repair.* (figure 2-118)

(1) Unscrew and replace damaged nipples (11).

(2) Unscrew and replace damaged pipe guides (12).

(3) Replace damaged filter (3) and brittle or compressed gaskets (4).

(4) Replace missing or clogged valve (13).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4
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5
11
1
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6
2
6
4710-065

Figure 2-118. Dust Catcher Assembly Replacement.

2-54. Delivery Light Assembly.

This task covers: Replace

INITIAL SETUP

Tools

10 mm combination wrench

Equipment Conditions

Delivery plexiguard open (para. 2-21)
Lower guard (O/S) door open (para. 2-19)
Flourescent lamp and starter removed
(TM 5-3610-286-10)

Additional Personnel Requirement

Electrician MOS 83E20

a. *Replace.* (figure 2-119)

(1) Remove two hex-head screws (1) and lamp fixture (2).

(2) Tag and remove wires (3) from lamp fixture (2).

(3) Remove hex nut (4) and cable (5).

(4) Remove two hex-head screws (6) and two support bolts (7).

(5) Replace two hex-head screws (6) in press side frames and replace two support bolts (7).

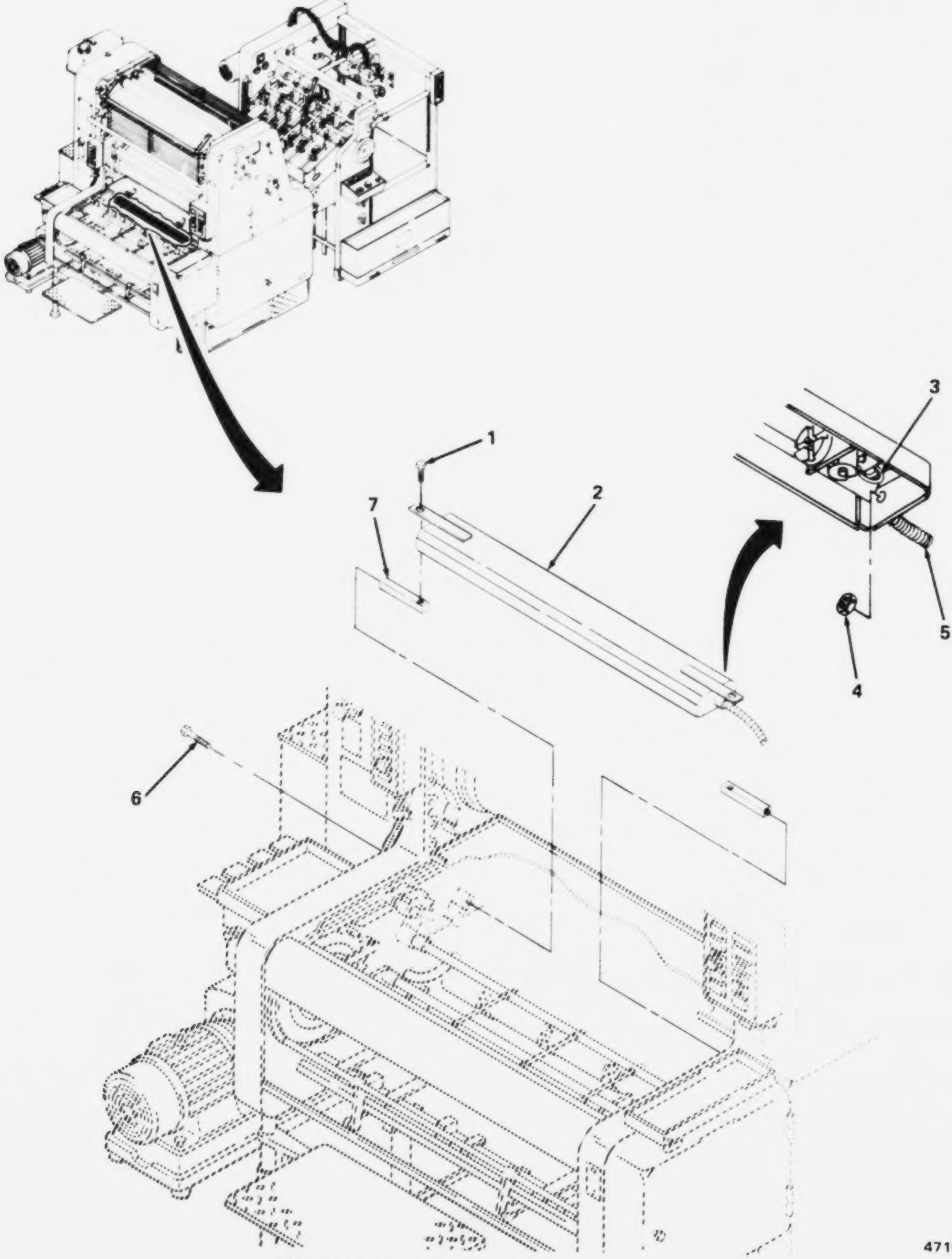
(6) Replace cable (5) and hex nut (4).

(7) Replace tagged wires (3) to lamp fixture (2) and remove tags.

(8) Position lamp fixture (2) on support bolts (7) and replace two hex-head screws (1).

NOTE

FOLLOW-ON MAINTENANCE:
(1) Install fluorescent lamp and starter (TM 5-3610-286-10).
(2) Close lower guard (O/S) door (para. 2-19).
(3) Close delivery end plexiguard (para. 2-21).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4710-117

Figure 2-119. Delivery Light Replacement.

2-55. Sheet Stop Assembly.

This task covers: a. Replace b. Repair

INITIAL SETUP

Tools

13 mm combination wrench
5 mm pin punch
Ball-peen hammer

Equipment Conditions

Lower guard (O/S) door open (para. 2-19)
Delivery guard raised (TM 5-3610-286-10)

---

a. Replace. (figure 2-120)

NOTE

Replace and repair of the sheet stop assembly is the same for both D/S and O/S. This procedure presents O/S removal.

(1) Remove ball handle (1).

(2) Remove retaining ring (2), tommy screw (3), and collar (4). Slide sheet stop (5) out of guide sleeve (6).

(3) Remove two hex screws (7), bearing (8), and spring (9).

(4) Remove guide sleeve (6).

(5) Remove two hex screws (10) and guide piece (11).

(6) Install guide piece (11) and two hex screws (10).

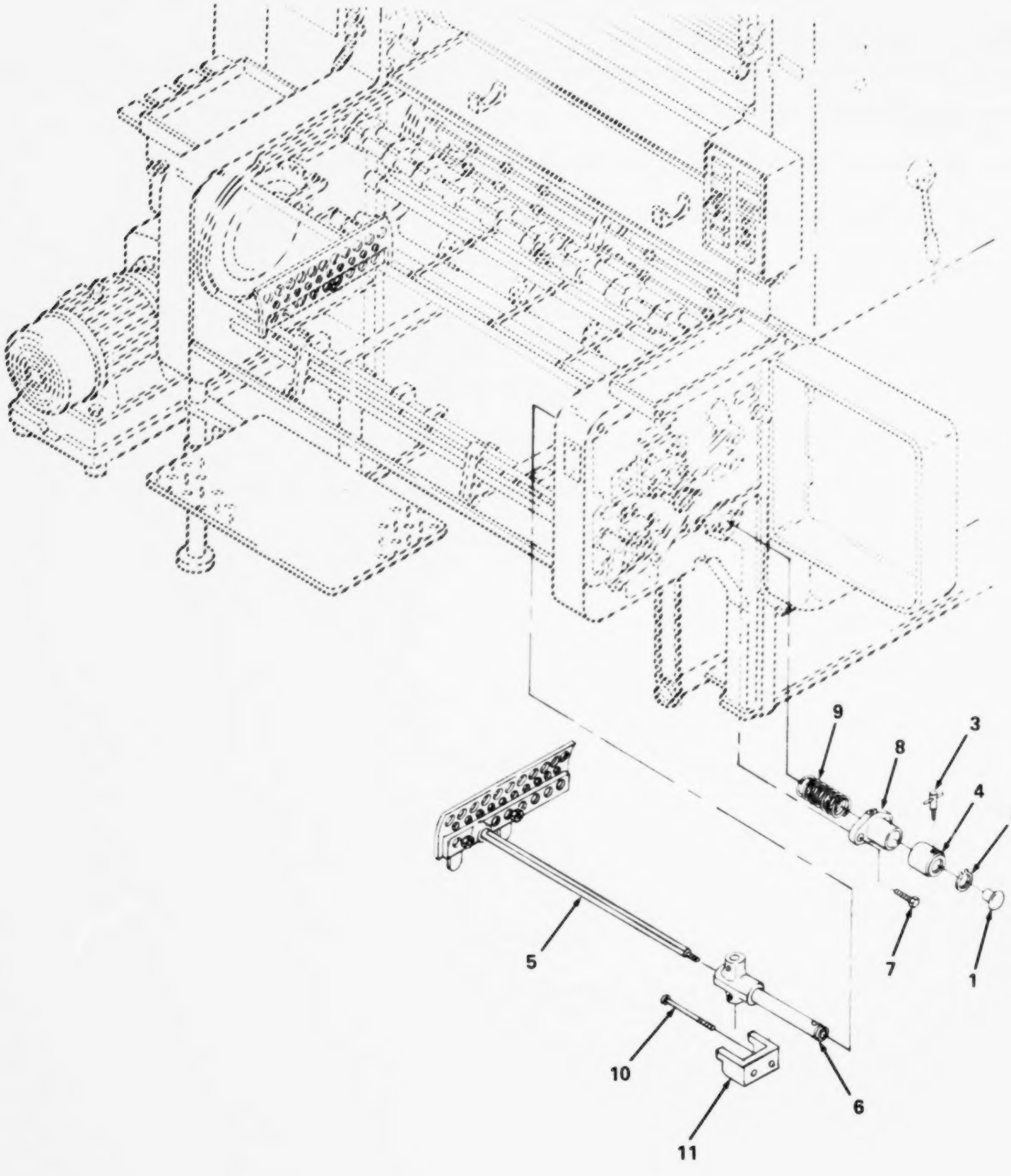
(7) Install guide sleeve (6).

(8) Install spring (9), bearing (8), and two hex screws (7).

(9) Slide sheet stop (5) into guiding sleeve (6).

(10) Replace collar (4), tommy screw (3), and retaining ring (2).

(11) Replace ball handle (1).


9
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7
1
10
6
11

4710 119

Figure 2-120. Sheet Stop Replacement.

2-55. Sheet Stop Assembly (cont).

b. Repair. *(figure 2-121)*

(1) Remove two spring pins (1), pins (2), and roller bearings (3) from guide sleeve (4).

(2) Remove two screws (5), hex nuts (6), and bars (7) from sheet stop (8).

(3) Remove spring pin (9) and remove sheet stop (8) from rod (10).

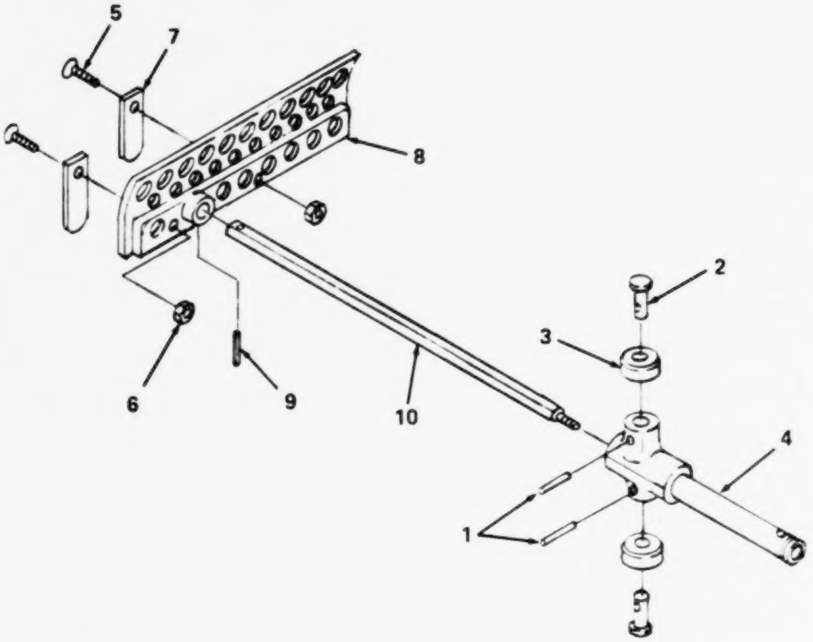
(4) Replace components showing excessive wear, distortion, damaged threads, cracks, bends, contaminated bearings, or missing components.

(5) Replace sheet stop (8) on rod (10) and replace spring pin (9).

(6) Install two screws (5), bars (7), and hex nuts (6) on sheet stop (8).

(7) Install two pins (2), roller bearings (3), and spring pins (1) on guide sleeve (4).

(8) Install repaired sheet stop assembly as in replace procedure.


5
7
8
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3
6
9
10
4
1
4710 120

Figure 2-121. Sheet Stop Repair.

NOTE

FOLLOW-ON MAINTENANCE:
(1) Close lower guard (O/S) door (para. 2-19).
(2) Lower delivery guard (TM 5-3610-286-10).

2-56. Blower Tube Assembly.

This task covers: a. Remove b. Repair c. Install

INITIAL SETUP

Tools	*Equipment Conditions*
3 mm pin punch Flat-tip screwdriver 17 mm combination wrench 32 mm combination wrench Ball-peen hammer	Delivery guard open (para. 2-21) Delivery light assembly removed (para. 2-54)

---

a. Remove. (figure 2-122)

(1) Remove spring tension pin (1) and knurled handle (2).

(2) Remove hose (3) from hose nipple (4) and remove nipple.

(3) Loosen hex nut (5) and remove elbow (6).

(4) Remove hex nut (7) and remove connecting piece (8) and rod (9).

(5) Holding blower tube assembly (10) with one hand, loosen hex nut (11), remove connecting piece (12), and lift out blower tube assembly (10).

b. Repair. (figure 2-122)

(1) Loosen hex nut (13) and remove tube (14). Repeat for each damaged tube.

NOTE

Replace tubes in same holes as they are originally.

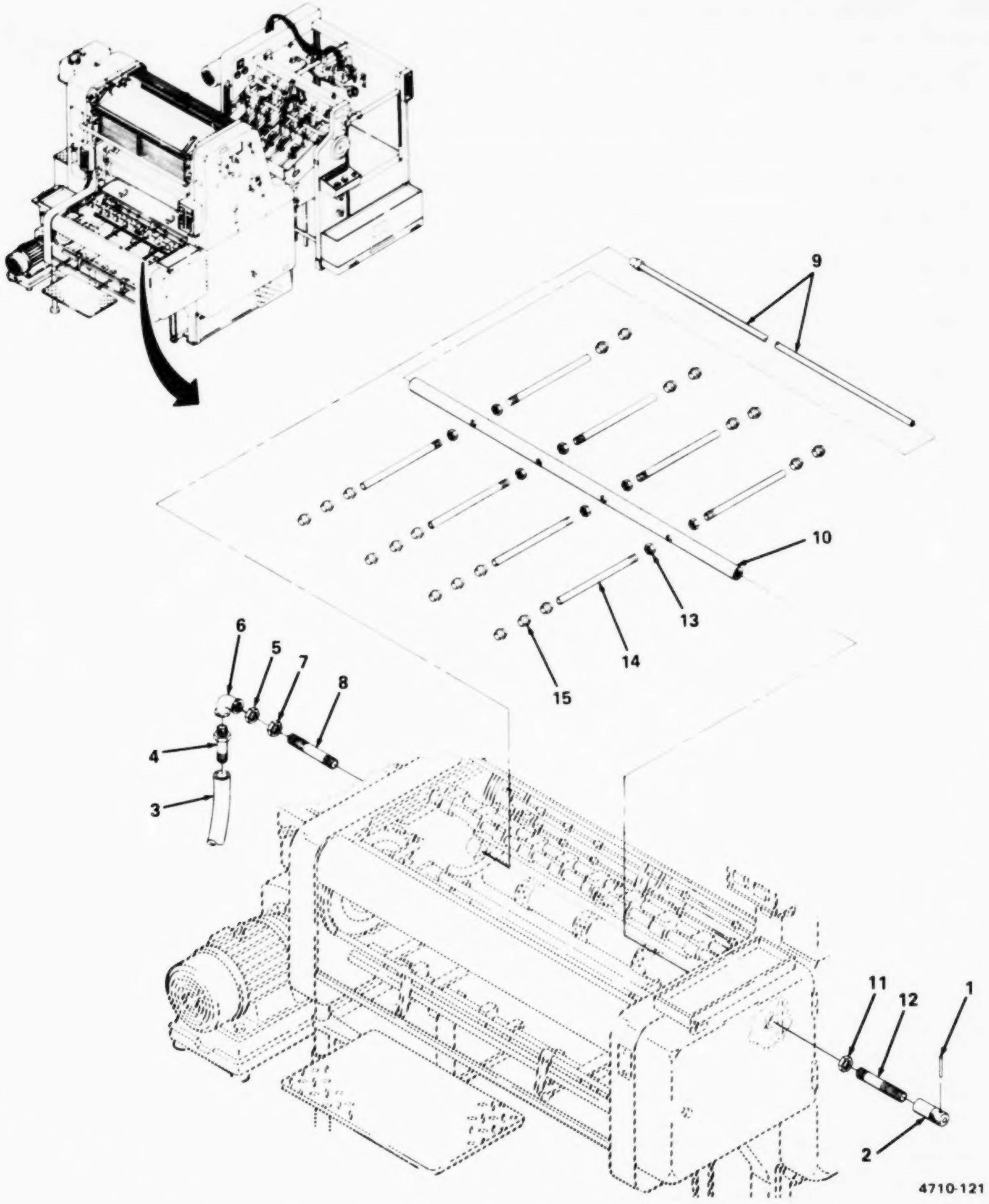
(2) Remove collars (15). Repeat for each worn collar.

(3) Replace damaged or missing tube. Replace missing collar.

(4) Replace damaged or corroded rod (9).

(5) Replace collars (15), two on tubes facing delivery end of press, three on tubes facing feeder end.

(6) Replace tube (14) with holes facing down, and replace hex nut (13).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11
12
1
2
4710-121

Figure 2-122. Blower Tube Assembly Removal.

2-56. Blower Tube Assembly (cont).

c. *Install.* (figure 2-123)

(1) Holding blower tube (1) with one hand, position blower tube assembly in delivery area so that tubes with two collars are facing delivery end of press, install connecting piece (2) and tighten hex nut (3).

(2) Install rod (4), connecting piece (5), and hex nut (6).

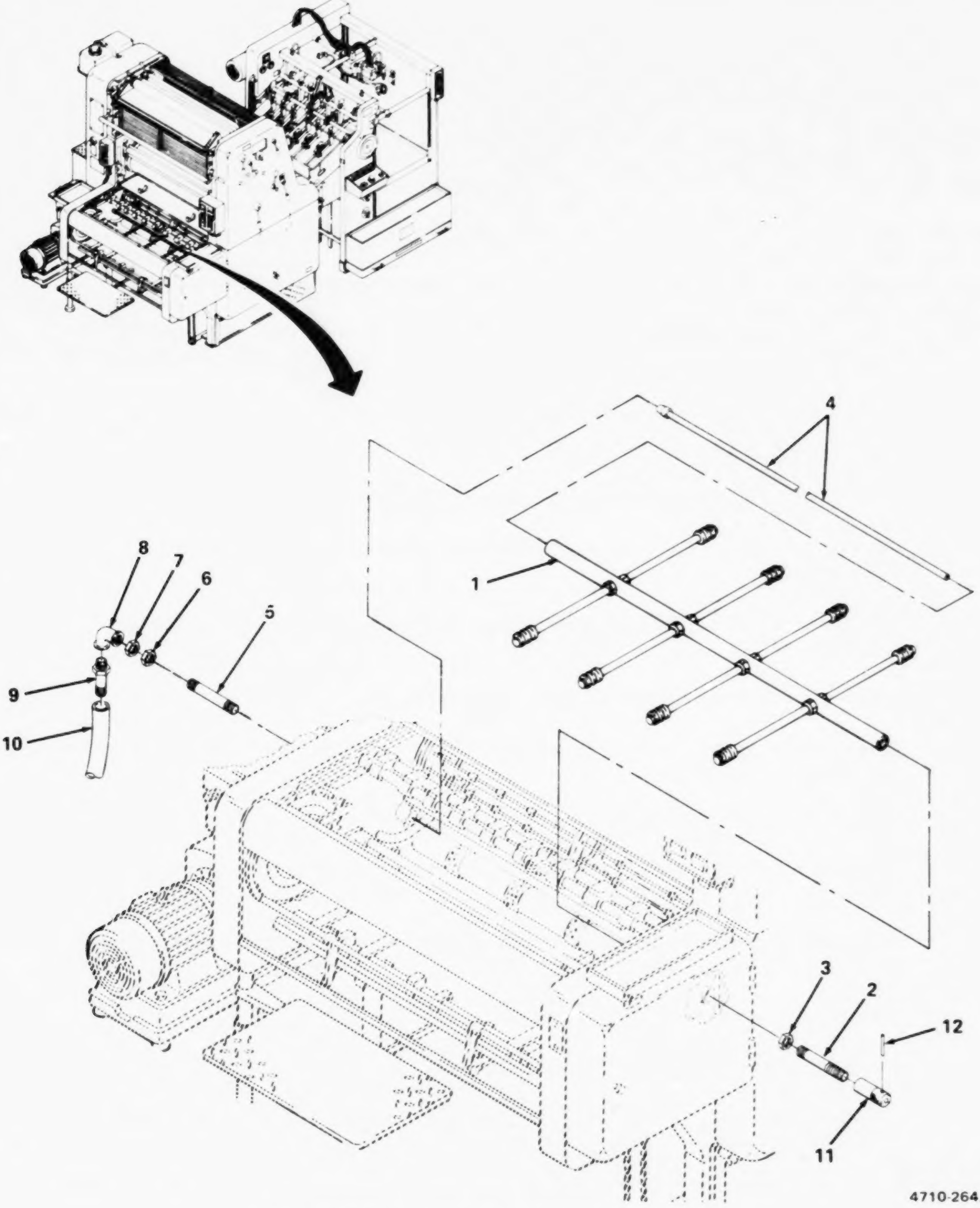
(3) Install hex nut (7) and elbow (8).

(4) Replace hose nipple (9) and hose (10).

(5) Replace knurled handle (11) and spring tension pin (12).

NOTE

FOLLOW-ON MAINTENANCE:
(1) Install delivery light assembly (para. 2-54).
(2) Close delivery guard (para. 2-21).


4
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8
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11
4710-264.1

Figure 2-123. Blower Tube Assembly Installation.

2-57. Gripper System Assembly.

This task covers: a. Remove b. Repair c. Install d. Adjust

INITIAL SETUP

Tools

5 mm hex key
6 mm hex key
10 mm combination wrench
19 mm combination wrench
0.050 x 0.375 x 8 in. flat-tip screwdriver
Retaining-ring pliers
Feeler gage

Additional Personnel Requirement

Printing and Binding Specialist MOS 83F20

Equipment Conditions

Delivery cover raised (TM 5-3610-286-10)
Delivery end plexiguard removed (para. 2-21)

b. *Remove.* (figure 2-124)

(1) Remove twelve socket-head screws (1), washers (2), and two chain guide segments (3).

(2) Remove four socket-head screws (4), washers (5), two chain guide segments (6), and four spacers (7).

(3) Loosen hex nut (8), hex-head screw (9), and two hex-head bolts (10) on chain tensioning devices (11).

(4) Remove four slotted screws (12) and two cover plates (13).

(5) Turn printing press by hand until gripper bar (14) needing replacement is located above and forward of blower tube (15).

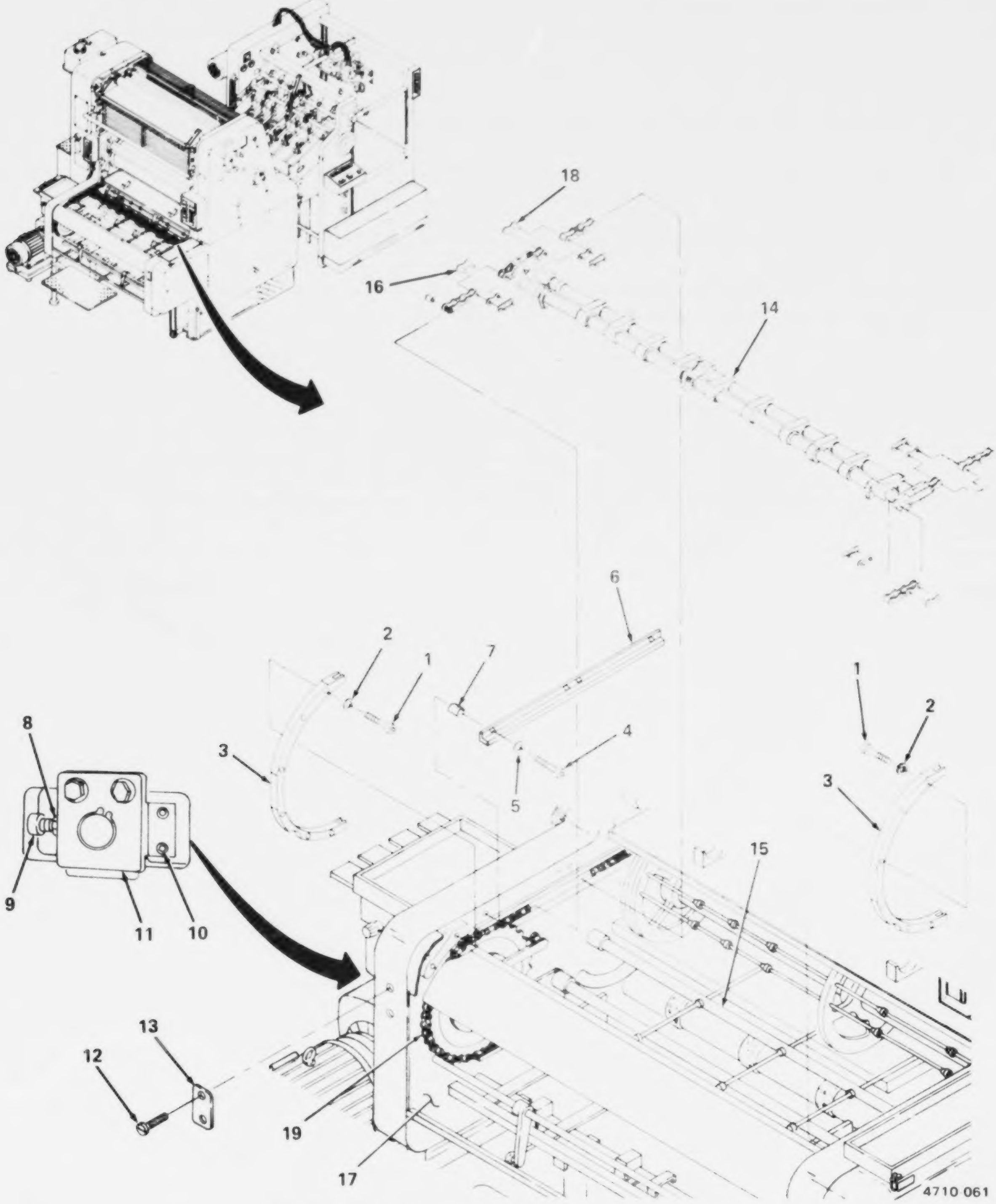
(6) Remove leading master link (16) from end of gripper bar (14).

(7) Turn printing press backward by hand until gripper bar (14) is located at open area of frame (17).

(8) While pulling outward on gripper bar (14), continue turning printing press until gripper bar is clear of delivery assembly.

(9) Remove trailing master link (18) from gripper bar (14).

(10) Remove gripper bar (14) from chain (19).


18
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4710 061

Figure 2-124. Gripper System Assembly Removal.

2-57. Gripper System Assembly (cont).

b. Repair. (figure 2-125)

(1) Remove twelve hex-head cap screws (1), twelve gripper pads (2), and twelve nuts (3).

(2) Remove three "E" clips (4), three washers (5), three pins (6), three compression springs (7) and compression rod guides (8).

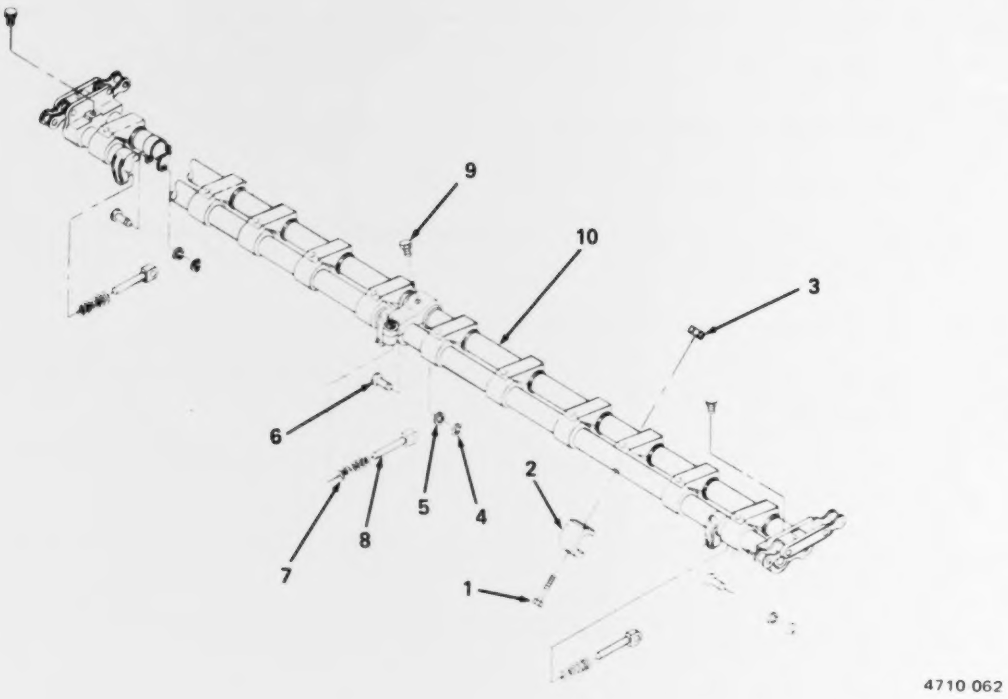
(3) Remove three grease fittings (9) from gripper bar (10).

(4) Replace weak or broken compression springs (7), damaged or missing gripper pads (2), and missing or clogged grease fittings (9).

(5) Replace three grease fittings (9) in gripper bar (10).

(6) Replace three compression springs (7) on compression rod guides (8) and replace assembly on gripper bar (10) by replacing three pins (6), three washers (5), and three "E" clips (4).

(7) Replace twelve gripper pads (2), twelve hex-head cap screws (1), and twelve nuts (3).


9
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7
1
4710 062

Figure 2-125. Gripper System Assembly Repair.

2-57. Gripper System Assembly (cont).

c. *Install.* (figure 2-126)

(1) Install chain (1) on gripper bar (2).

(2) Install trailing master link (3) on gripper bar (2).

(3) While pulling outward on gripper bar (2), turn printing press until gripper bar is located at open area of frame (4).

(4) Install leading master link (5) on end of gripper bar (2).

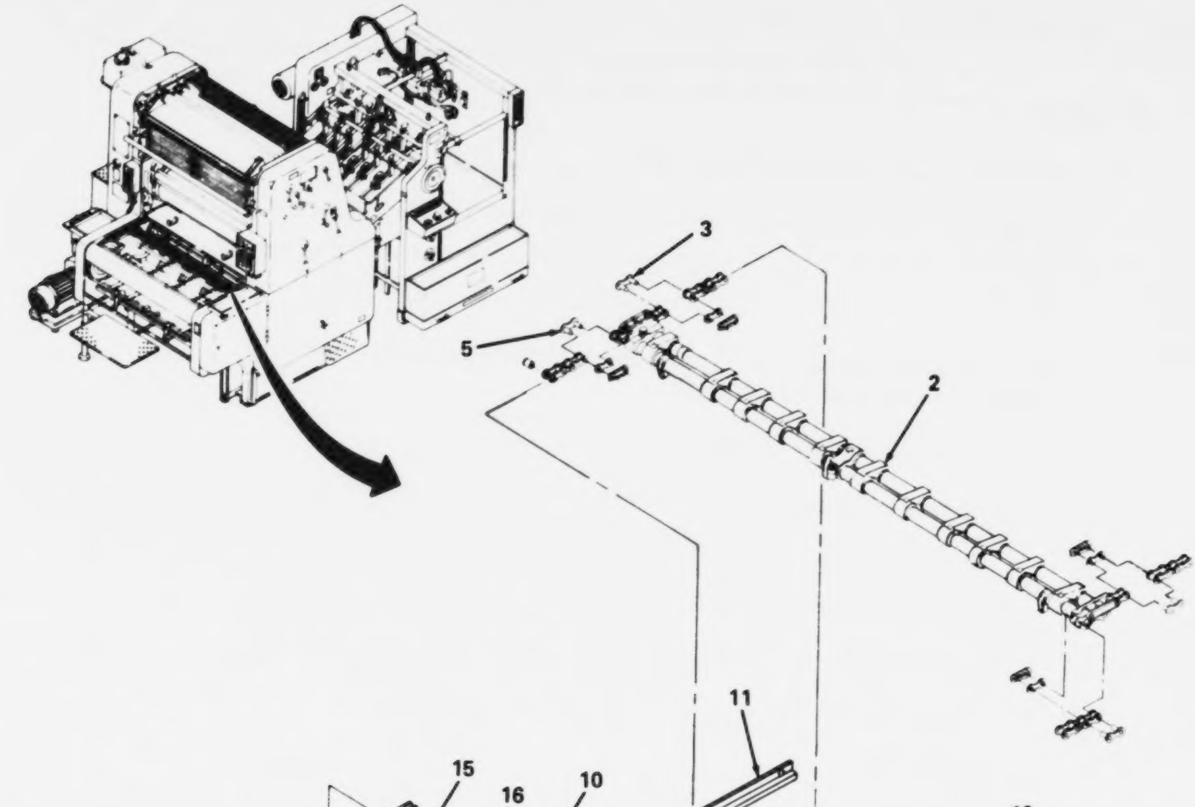
(5) Tighten hex-head screw (6), hex nut (7), and two hex-head bolts (8) on chain tensioning devices (9).

(6) Install four spacers (10), two chain guide segments (11), four washers (12), and four socket-head screws (13).

(7) Install two chain guide segments (14), twelve washers (15), and twelve socket-head screws (16).

(8) Install two plates (17) and four slotted screws (18).

(9) Adjust gripper system (para. d).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4710-265.1

Figure 2-126. Gripper System Assembly Installation.

2-57. Gripper System Assembly (cont).

d. Adjust.

(1) *Individual gripper pressure.* (figure 2-127)

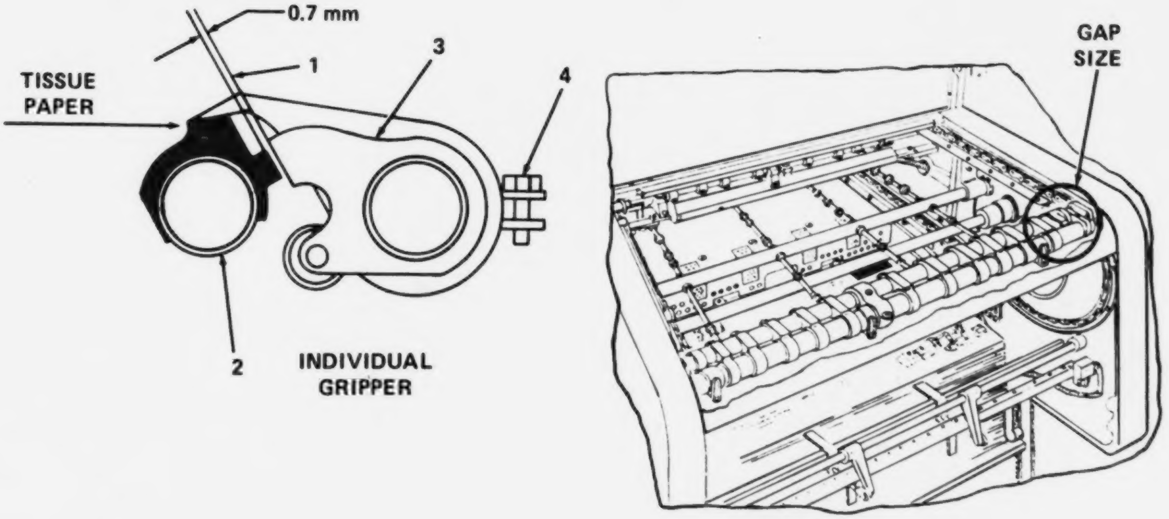
(a) Place a 0.7 mm feeler gage (1) between gripper bar (2) and lever (3) on an individual gripper.

NOTE

Some presses require more or less pressure. Size of gap to be used is stamped on right side of gripper bar.

(b) Loosen socket-head screw (4).

(c) Adjust each individual gripper by placing tissue paper under the gripper and tightening socket-head screw (4) until paper can just be pulled out.



INDIVIDUAL GRIPPER

SPECIFIC PRINTING PRESS ADJUSTMENT SETTING

Figure 2-127. Gripper Adjustment.

(2) ***Delivery grippers to impression cylinder timing.*** (figure 2-128)

(a) Install delivery chains with gripper systems in the direction of press rotation (forward).

(b) Place the first chain links (1) on the chain sprocket (2) so that a gripper bar is positioned closest to the impression cylinder and the impression cylinder gripper is facing the gripper bar.

(c) Turn press forward by hand and check that timing markings on chain (1) and sprocket (2) meet.

(d) Lock, then adjust chain tension (para. (3) below).

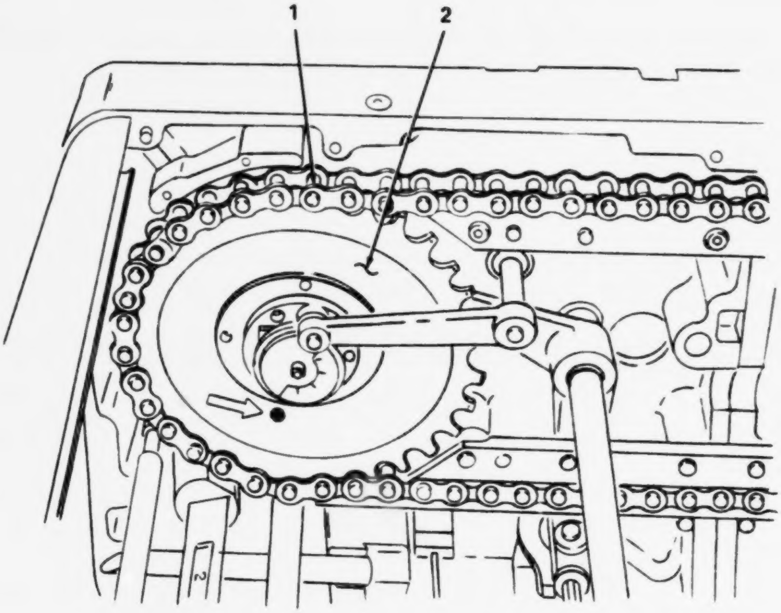


Figure 2-128. Delivery Chain Timing Adjustment.

2-57. Gripper System Assembly (cont).

(3) *Delivery chain tension adjustment.* (figure 2-129)

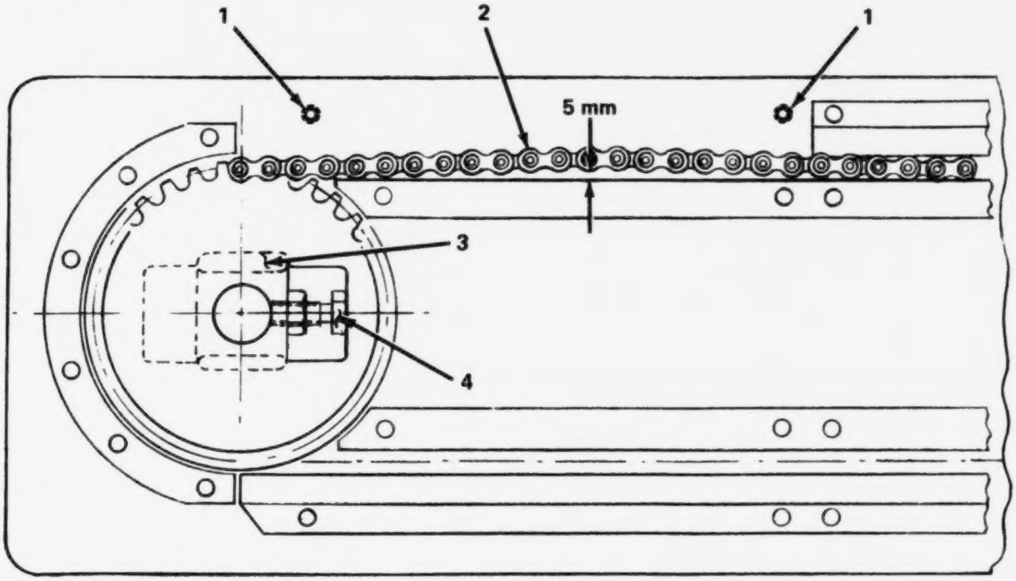
(a) Remove upper chain guides (1) at D/S and O/S.

(b) Lift chain (2) by hand and check for 5 mm deflection, indicating correct tension.

(c) Adjust tension, if required, by loosening locking screws on bearing plates (3) and rotating adjusting screw (4) to increase or decrease tension.

(d) Tighten locking screws on bearing plates (3).

(e) Replace upper chain guides (1) at D/S and O/S and aline them at same level as adjustment chain guides so that they do not interfere with chain movement.



4710-029

Figure 2-129. Delivery Chain Tension Adjustment.

NOTE

FOLLOW-ON MAINTENANCE:
(1) Install delivery end plexiguard (para. 2-21).
(2) Close delivery cover (TM 5-3610-286-20).

2-58. Suction Slowdown Assembly.

This task covers: a. Remove b. Repair c. Install

INITIAL SETUP

Tools

5 mm hex key
6 mm hex key
8 mm combination wrench
10 mm combination wrench
13 mm combination wrench
17 mm combination wrench
Ball-peen hammer
4 mm pin punch
1.0 x 6.0 x 0.5 mm flat-tip screwdriver
0.050 x 0.375 x 8 in. flat-tip screwdriver

Equipment Conditions

Delivery guard open (TM 5-3610-286-10)
Delivery light removed (para. 2-54)

Additional Personnel Requirement

Printing and Binding Specialist MOS 83F20

a. Remove. (figure 2-130)

(1) Slide suction slowdown assembly (1) out as far as it will go.

(2) Loosen hose clamp (2) and remove hose (3).

(3) Remove two slotted screws (4) and drop limit switch (5), but do not disconnect electrically.

(4) Remove four screws (6) and drop suction motor (7) but do not disconnect electrically.

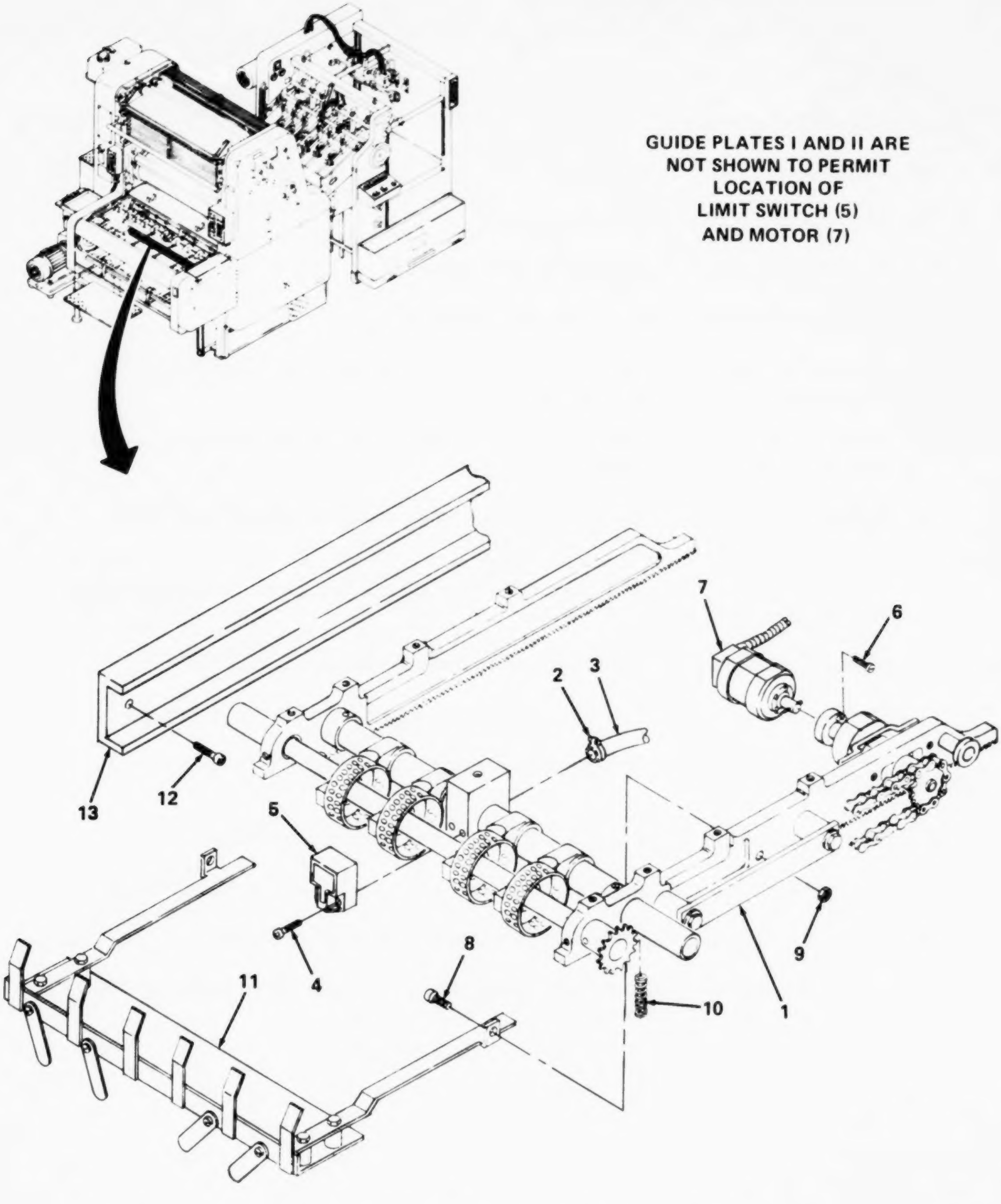
(5) Remove four screws (8), four nuts (9), two springs (10), and remove sheet stop (11).

(6) Remove two socket-head stop screws (12) from guide rails (13).

WARNING

Assembly exceeds 35 pounds. Use two persons to remove.

(7) Remove suction slowdown assembly (1).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GUIDE PLATES I AND II ARE NOT SHOWN TO PERMIT LOCATION OF LIMIT SWITCH (5) AND MOTOR (7)

4710-123

Figure 2-130. Suction Slowdown Assembly Removal.

2-58. Suction Slowdown Assembly (cont).

b. Repair.

(1) *Disassembly.* (figure 2-131)

(a) Remove master link (1) and chain (2).

(b) Drive out pins (3) and remove sprockets (4).

(c) Remove seven screws (5) and remove guide plate II (6).

(d) Remove four screws (7) and remove guide plate I (8).

(e) Remove four guide straps (9) by removing nuts (10) and screws (11), and remove two attaching strips (12) by removing four screws (13).

(f) Disassemble sheet stop (14) by removing four screws (15) and four washers (16), and separate holders (17) from sheet stop (14).

(g) Remove four nuts (18) and four screws (19), and separate four links (20) from sheet stop (14).

(h) Drive out pins (21) and separate side end shafts (22) and guide rails (23 and 24) from vacuum pipe (25).

(i) Remove two screws (26), two washers (27), plate (28), and two spacers (29).

(j) Remove four tapered pins (30) and separate four suckerwheels (31) and shaft (32).

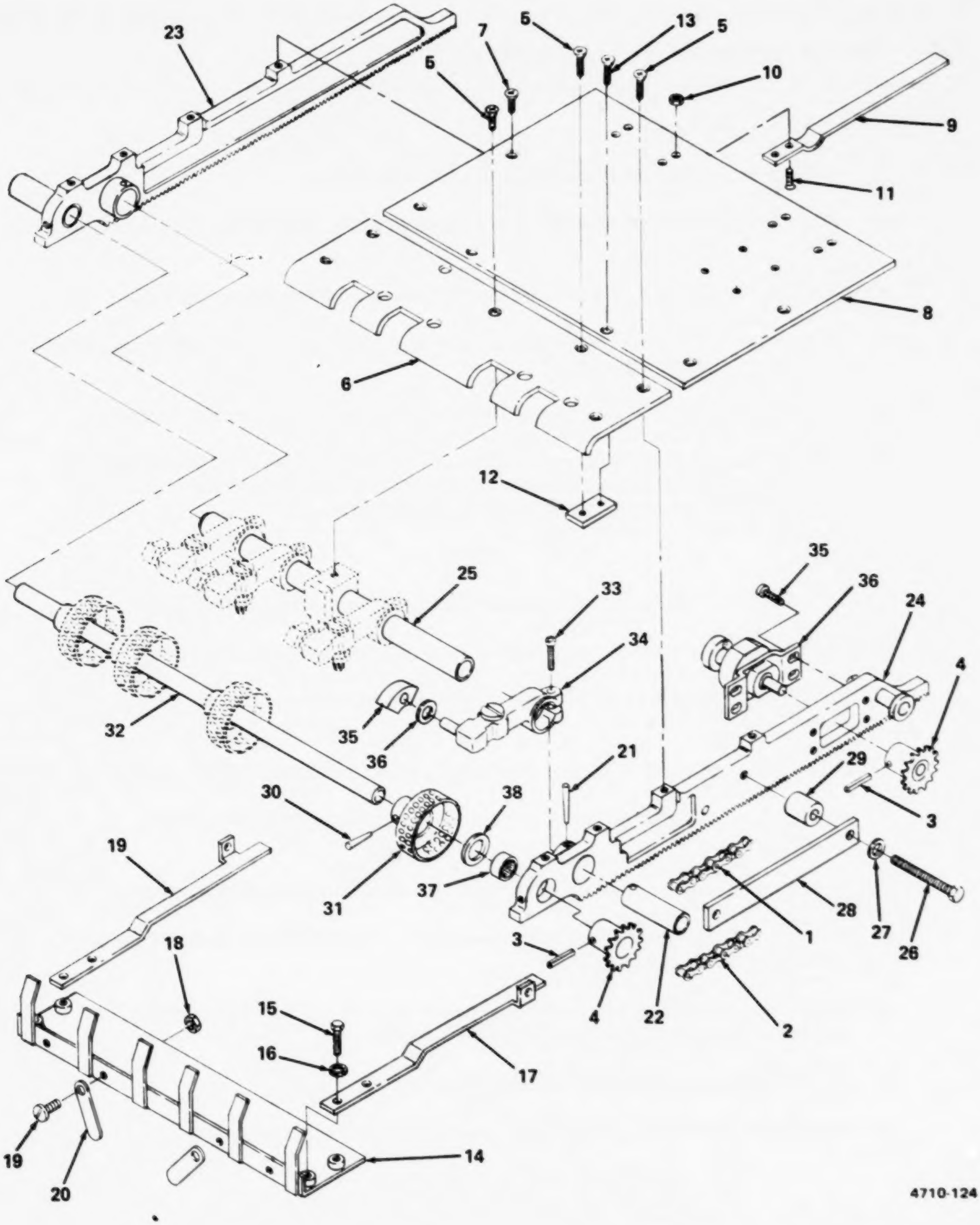
(k) Loosen four screws (33) and separate four suction brackets (34) from vacuum pipe (25).

(l) Slide four suction pieces (35) and washers (36) off suction brackets (34).

(m) Remove four screws (35) and remove gear box assembly (36) from guide plate I (24).

(n) Drive shaft bearing (37) and washer (38) from each guide rail (23 and 24).

(o) Replace frozen or binding bearings, binding valves, damaged suckerwheels, and other worn or damaged components.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4710-124

Figure 2-131. Suction Slowdown Assembly Disassembly.

2-58. Suction Slowdown Assembly (cont).

(2) *Assembly.* (figure 2-132)

(a) Replace bearings (1) and washers (2) in guide rails (3 and 4).

(b) Slide suckerwheels (5) onto shaft (6) with open side of wheels facing sprocket end of shaft.

(c) Aline pin holes in suckerwheel collars with holes in shaft and replace pins (7).

(d) Slide suction brackets (8) on to vacuum pipe (9), aline nozzle hole in bracket with hole in pipe, and tighten screws (10).

(e) Slide washer (11) and suction piece (12) on suction tube of each suction bracket (8).

(f) Install assembled vacuum pipe (9) and assembled suckerwheel shaft (6) in guide rails (3 and 4), making sure that the suction pieces (12) are nested in suction wheels with curved surfaces conforming with inside curve of wheels.

NOTE

Take care not to knock out shaft bearings (1) in guide rails (3 and 4).

(g) Replace end shafts (13) on vacuum pipe (9), aline pin holes, and replace pins (14).

(h) Attach holders (15) to sheet stop (16) using four screws (17) and four washers (18). Install four links (19) on sheet stop using screws (20) and nuts (21).

(i) Attach gear box assembly (22) to guide rail (4) using four screws (23).

(j) Assemble guide plate I (24) and guide plate II (25) with two strips (26) and four screws (27).

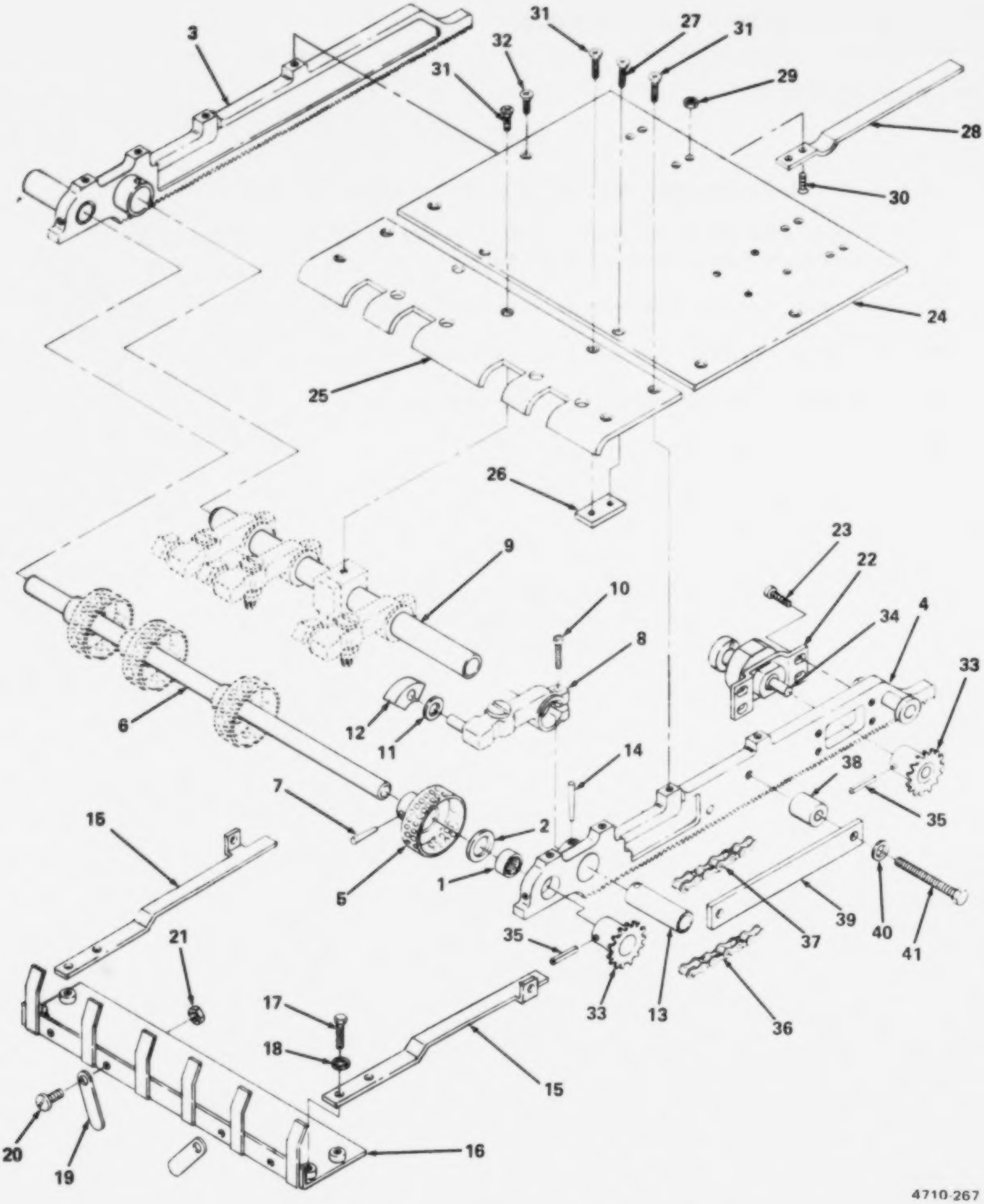
(k) Attach four guide straps (28) to guide plate I (24) with nuts (29) and screws (30).

(l) Install assembled guide plates I and II (24 and 25) to guide rails (3 and 4) with seven screws (31) and four screws (32).

(m) Install two sprockets (33) on suckerwheel drive shaft (6) and suction motor gear box shaft (34). Aline pin holes and insert spring pins (35).

(n) Install chain (36) on sprockets (33) and replace master link (37).

(o) Install two spacers (38), plate (39), two washers (40), and two screws (41).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4710-267

Figure 2-132. Suction Slowdown Assembly Assembly.

2-58. Suction Slowdown Assembly (cont).

c. *Install.* (figure 2-133)

WARNING

Assembly exceeds 35 pounds. Use two persons to install.

(1) Position suction slowdown assembly (1) on guide rails (2) and slide back far enough to clear socket-head stop screws (3). Install screws.

(2) Install sheet stop (4) with four screws (5), four nuts (6), and two springs (7).

(3) Install suction motor (8) on gear box assembly (9) and install four screws (10).

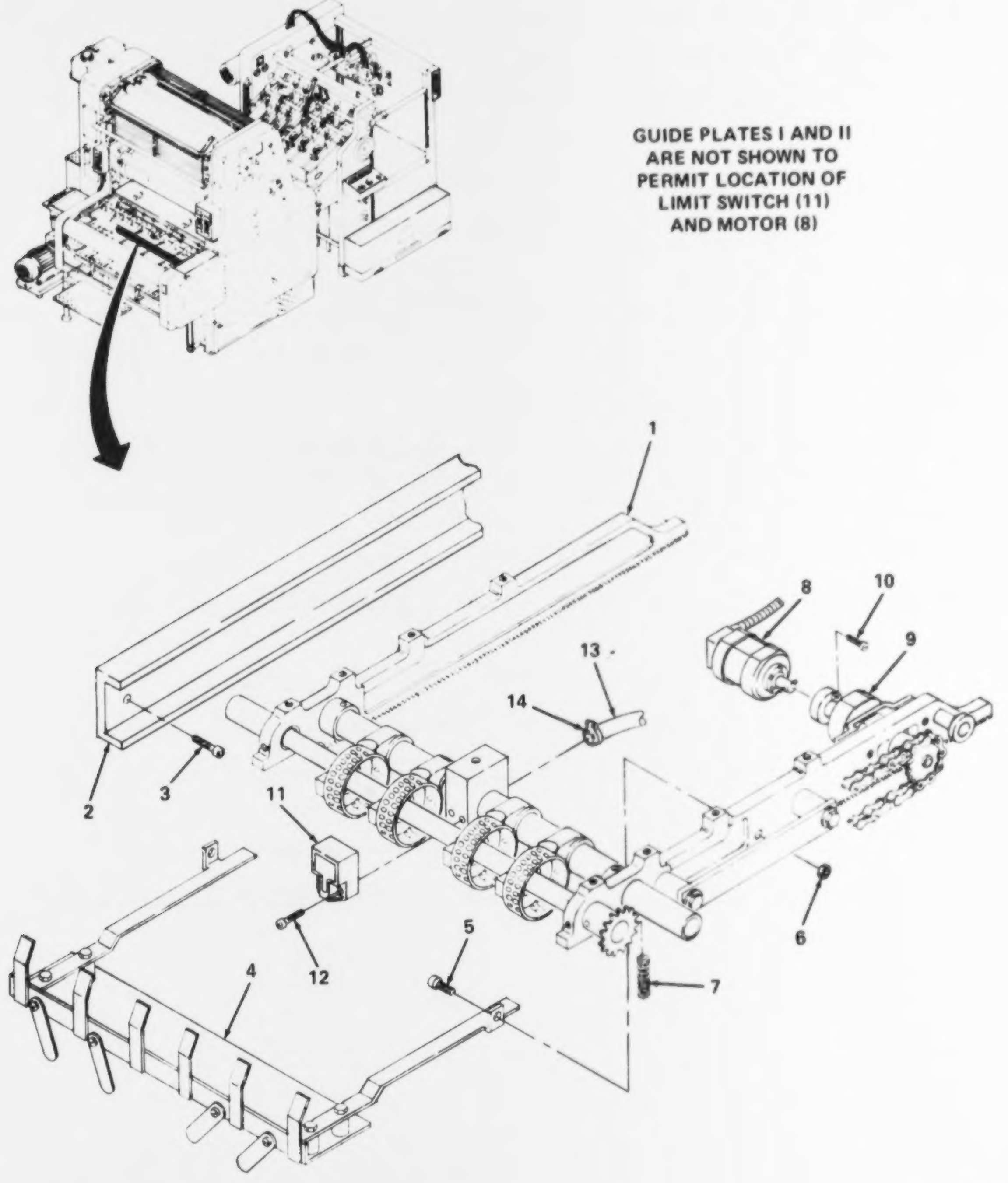
(4) Install limit switch (11) by replacing two slotted screws (12).

(5) Install hose (13) and tighten hose clamp (14).

(6) Slide assembly in as far as it will go.

NOTE

FOLLOW-ON MAINTENANCE:
(1) Install delivery light (para. 2-54).
(2) Close delivery guard (TM 5-3610-286-10).



GUIDE PLATES I AND II
ARE NOT SHOWN TO
PERMIT LOCATION OF
LIMIT SWITCH (11)
AND MOTOR (8)

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TPC 4710-266

Figure 2-133. Suction Slowdown Assembly Installation.

2-59. Suction Drum Motor.

This task covers: a. Remove b. Install

INITIAL SETUP

Tools	*Additional Personnel Requirment*
6 mm hex key 8 mm combination wrench .046 x 0.3125 x 6 in. flat-tip screwdriver	Electrician MOS 35E20

a. *Remove.* (figure 2-134)

WARNING

Hazardous electrical voltages exist within printing press. Do not connect or disconnect any electrical components while power is on. Death, serious electrical shock, or burns may result.

(1) Slide suction drum assembly (1) all the way out.

(2) Remove four hex-head screws (2) from motor side of coupling (3) and separate motor (4) from gear box (5).

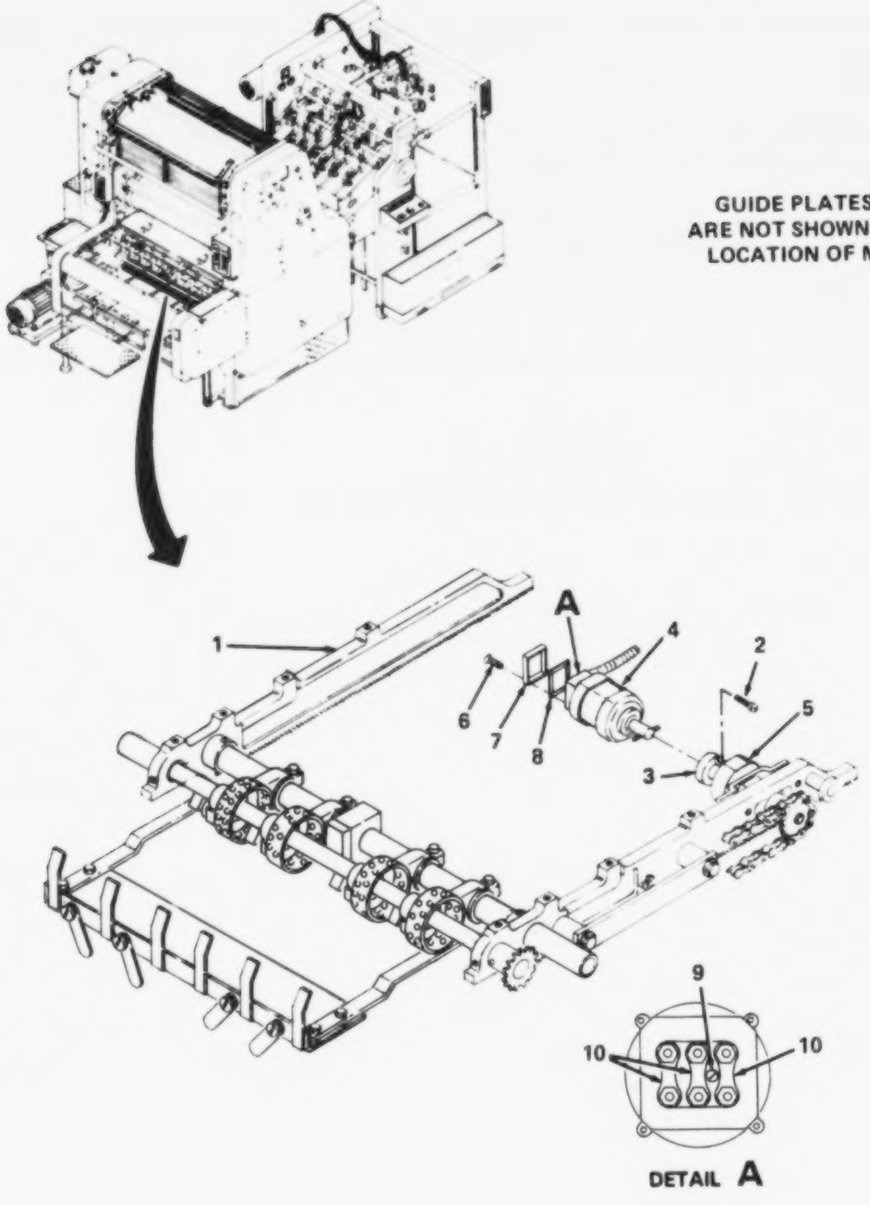
NOTE

Pull motor straight out from gear box.

(3) Remove four screws (6), terminal box cover (7), and gasket (8) from back of motor (4). Retain gasket.

(4) Loosen slotted ground screw (9) and remove green/white ground lead.

(5) Loosen terminal nuts on connector terminals (10) and tag and remove three black phase leads.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DETAIL A

GUIDE PLATES I AND II
ARE NOT SHOWN TO PERMIT
LOCATION OF MOTOR (4)

4710-125

Figure 2-134. Suction Drum Motor Removal.

2-59. Suction Drum Motor (cont).

b. *Install.* (figure 2-135)

(1) Loosen terminal nuts on connector terminals (1) and install three tagged black phase leads. Tighten terminal nuts and remove tags.

(2) Install green/white ground lead on slotted ground screw (2) and tighten screw.

(3) Install gasket (3) and temrinal box cover (4). Replace four screws (5).

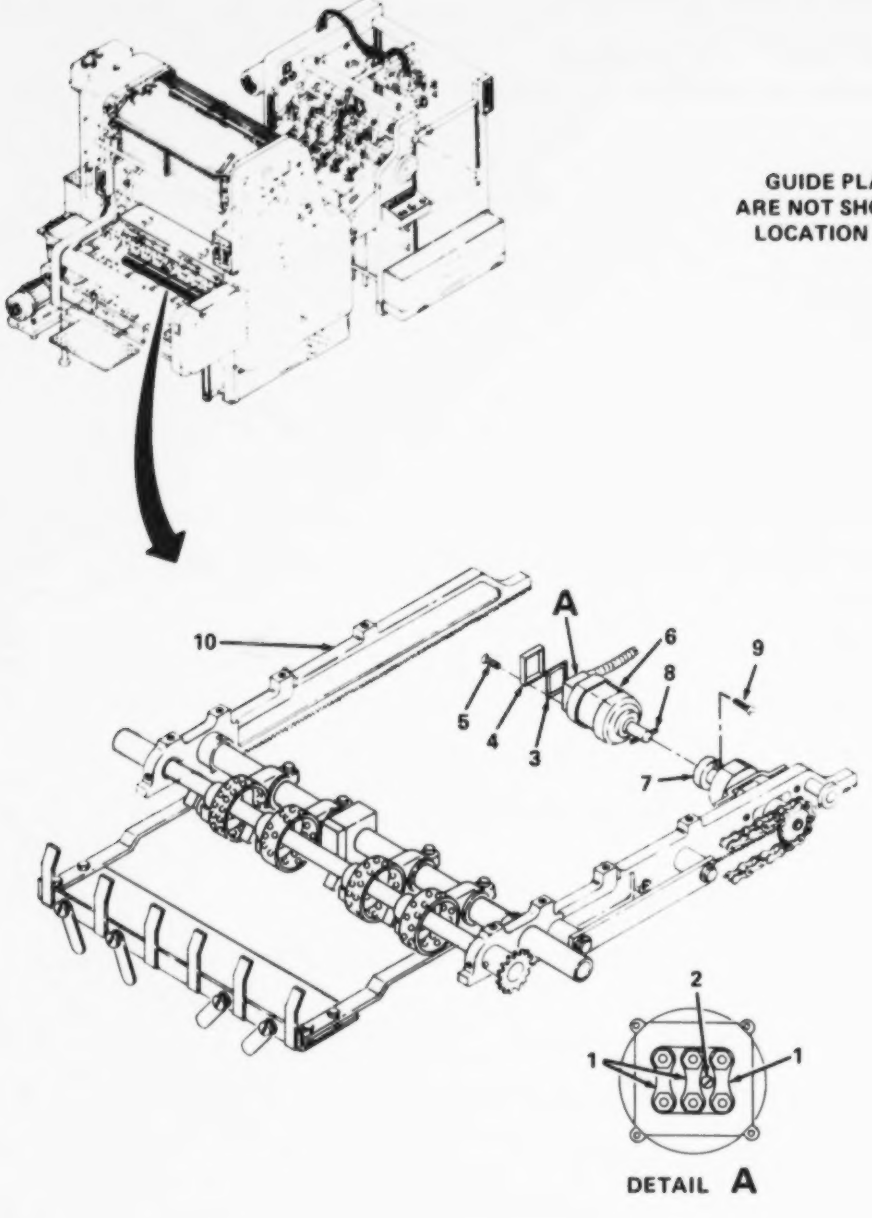
(4) Apply joint compound to motor gear box coupling surfaces and join motor (6) to gear box coupling (7).

NOTE

Aline motor shaft pin (8) with key slot in gear box shaft at coupling (7).

(5) Replace four socket-head screws (9).

(6) Slide suction drum assembly (10) all the way in.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DETAIL A

GUIDE PLATES I AND II
ARE NOT SHOWN TO PERMIT
LOCATION OF MOTOR (6)

4710-268

Figure 3-135. Suction Drum Motor Installation.

2-60. Suction Drum Limit Switch.

This task covers: a. Test b. Replace

INITIAL SETUP

Tools

Multimeter
0.050 x 0.375 x 8 in. flat-tip screwdriver
No. 2 x 4 in. cross-tip screwdriver
17 mm combination wrench

Equipment Condition

Paper pallet removed (TM 5-3610-286-10)
Paper stop removed (para. 2-58)

Additional Personnel Required

Electrician MOS 83F20

a. *Test.* Test the suction drum limit switch in accordance with the procedures given in para. 2-16, a.

b. *Replace.* (figure 2-136)

(1) Remove two mounting screws (1) and drop switch down to allow access to terminals.

(2) Loosen two captive screws (2) and open hinged switch cover (3).

(3) Loosen two retaining screws (4). Tag electrical leads (5) position identification and remove them.

(4) Twist cable collar (6) clockwise and pull cable (7) out of switch.

(5) Insert electrical leads (5) into switch and twist cable collar (6) counterclockwise to secure cable (7).

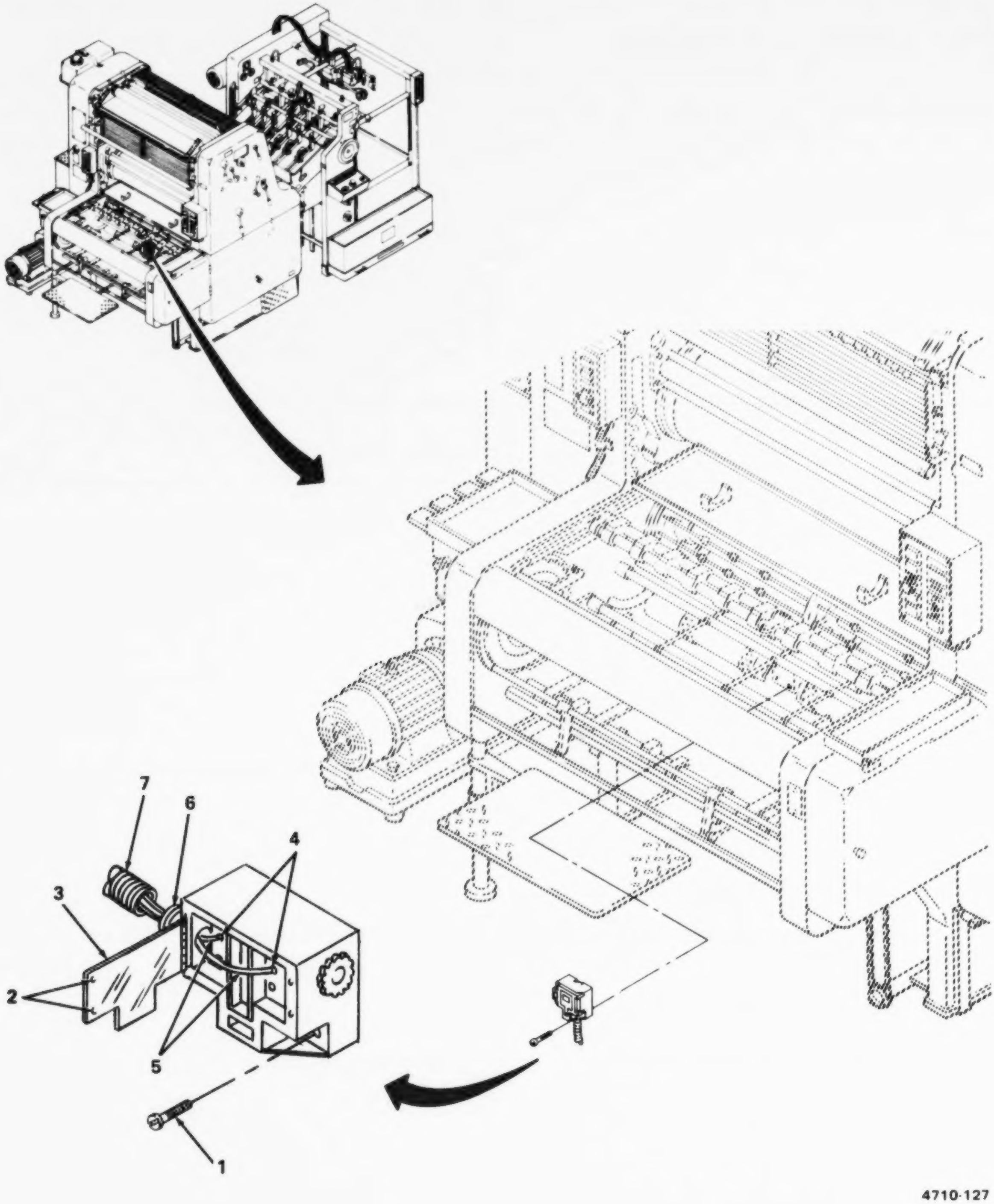
(6) Install leads (5) as tagged and tighten screws (4).

(7) Close hinged cover (3) and tighten two captive screws (2).

(8) Install switch with two mounting screws (1).

NOTE

FOLLOW-ON MAINTENANCE:
Install paper stop (para. 2-58).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4710-127

Figure 2-136. Suction Drum Limit Switch Replacement.

2-61. Chain Sprocket Assembly.

This task covers: a. Remove b. Repair c. Install

INITIAL SETUP

Tools

5 mm hex key
Retaining-ring pliers
Ball-peen hammer
5 mm pin punch
13 mm combination wrench
19 mm combination wrench

Equipment Condition

Delivery grippers removed (para. 2-57)
Dust catcher removed (para. 2-53)
Lower guard door (O/S) open (para. 2-19)
Delivery plexiguard removed (para. 2-21)

Additional Personnel Requirement

Electrician MOS 35E20

a. Remove. (figure 2-137)

(1) Remove two hex-head screws (1) and tool tray (2).

(2) Remove screw (3), washer (4), clamp (5), and tacho dynamo (6).

(3) Loosen lock nut (7) and tensioning screw (8).

(4) Remove hex nut (9) and powder spray cam (10).

(5) Remove two socket-head screws (11), flange (12), plate spacer (13), tacho dynamo drive shaft (14), pin (15), and felt ring (16).

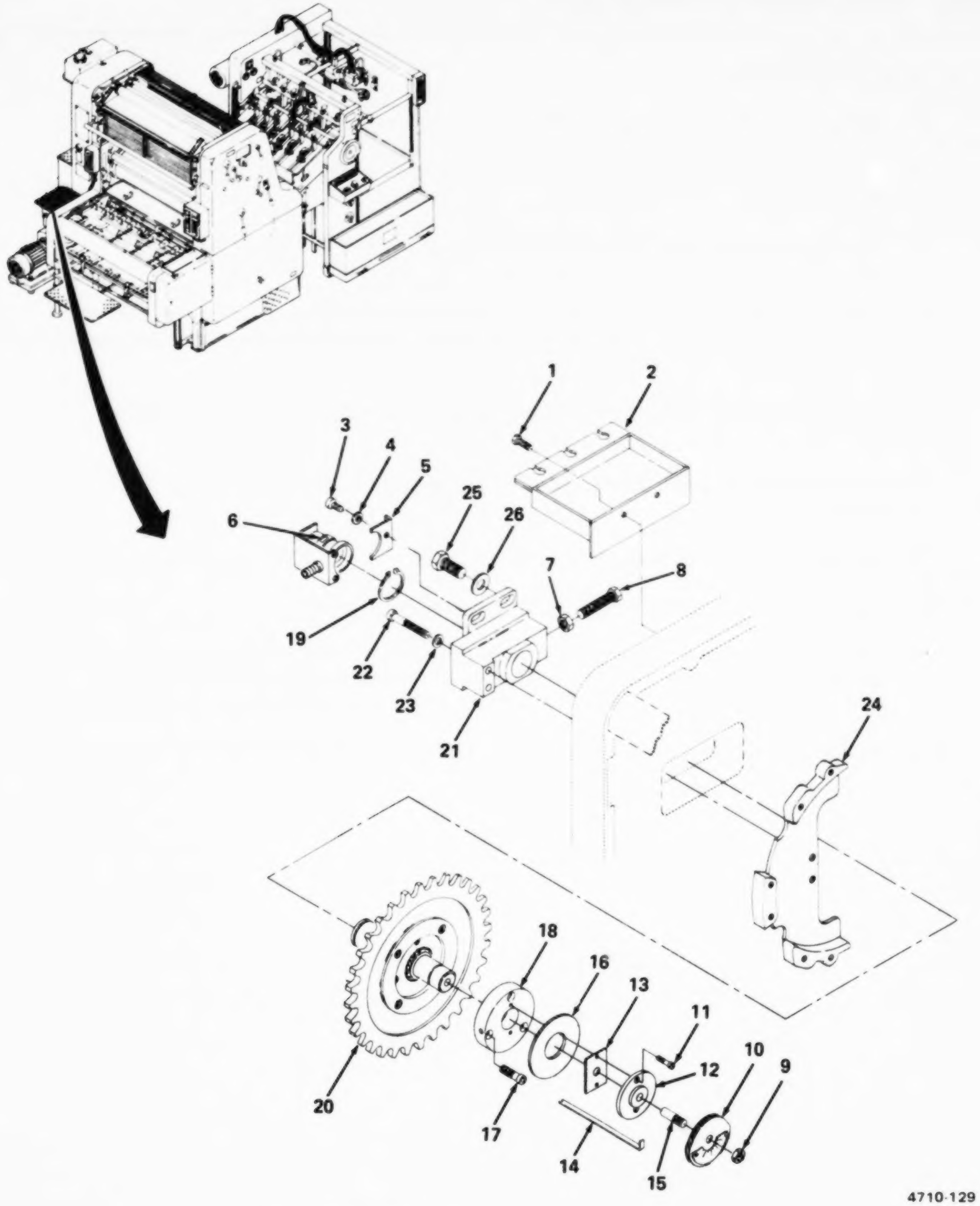
(6) Remove three socket-head cap screws (17) and flange (18).

(7) Remove retaining ring (19).

(8) Remove chain sprocket and bolt (20) out of bearing (21) and remove from O/S of press side plate.

(9) Remove two socket-head cap screws (22), ribbed washers (23), and segment (24).

(10) Remove two hex-head cap screws (25), washers (26), and bearing (21).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4710-129

Figure 2-137. Chain Sprocket Assembly Removal.

2-61. Chain Sprocket Assembly (cont).

b. *Repair.* (figure 2-138)

(1) Remove retaining ring (1), bearing (2), and retaining ring (3), from bolt (4).

(2) Remove four socket-head cap screws (5) and separate eccentric disk (6) from sprocket (7).

(3) Remove two ribbed nails (8) and separate indicator plate (9) and two powder spray cams (10).

(4) Replace frozen or binding bearing, worn cams, damaged or deformed sprocket, bent or missing tacho dynamo drive shaft. Replace worn or unreadable indicator plate and worn eccentric disk.

(5) Assemble indicator plate (9) and two powder spray cams (10), and replace two ribbed nails (8).

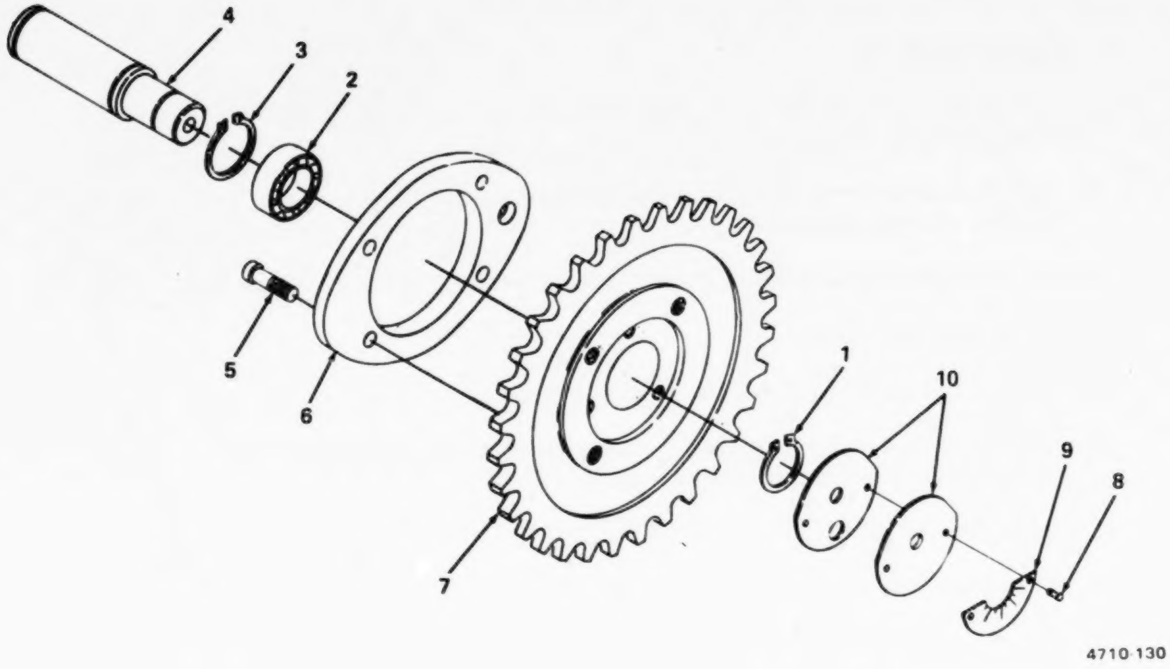
(6) Assemble eccentric disk (6) to sprocket (7) and replace four socket-head cap screws (5).

(7) Replace retaining ring (3) and bearing (2) on bolt (4).

(8) Replace bolt (4) into sprocket (7) and replace retaining ring (1).

(9) Remove and tag two white wires from tacho dynamo (from feeder suppression/hour meter) and remove and tag two red wires from tacho dynamo (from sensor) and replace tacho dynamo if defective.

(10) Replace two tagged red and two tagged white wires to tacho dynamo and remove tags.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4710-130

Figure 2-138. Chain Sprocket Assembly Repair.

2-61. Chain Sprocket Assembly (cont).

c. *Install.* (figure 2-139)

(1) Install bearing (1) on D/S of press side plate and replace two washers (2), and hex-head cap screws (3).

(2) Install segment (4) on O/S of press side plate and replace two ribbed washers (5), and socket-head cap screws (6).

(3) Install chain sprocket and bolt (7) into bearing (1) through O/S of press side plate.

(4) Install retaining ring (8).

(5) Install three socket-head cap screws (9) and flange (10).

(6) Install felt ring (11), pin (12), tacho dynamo drive shaft (13), plate spacer (14), flange (15), and two socket-head screws (16).

(7) Install powder spray cam (17) and hex nut (18).

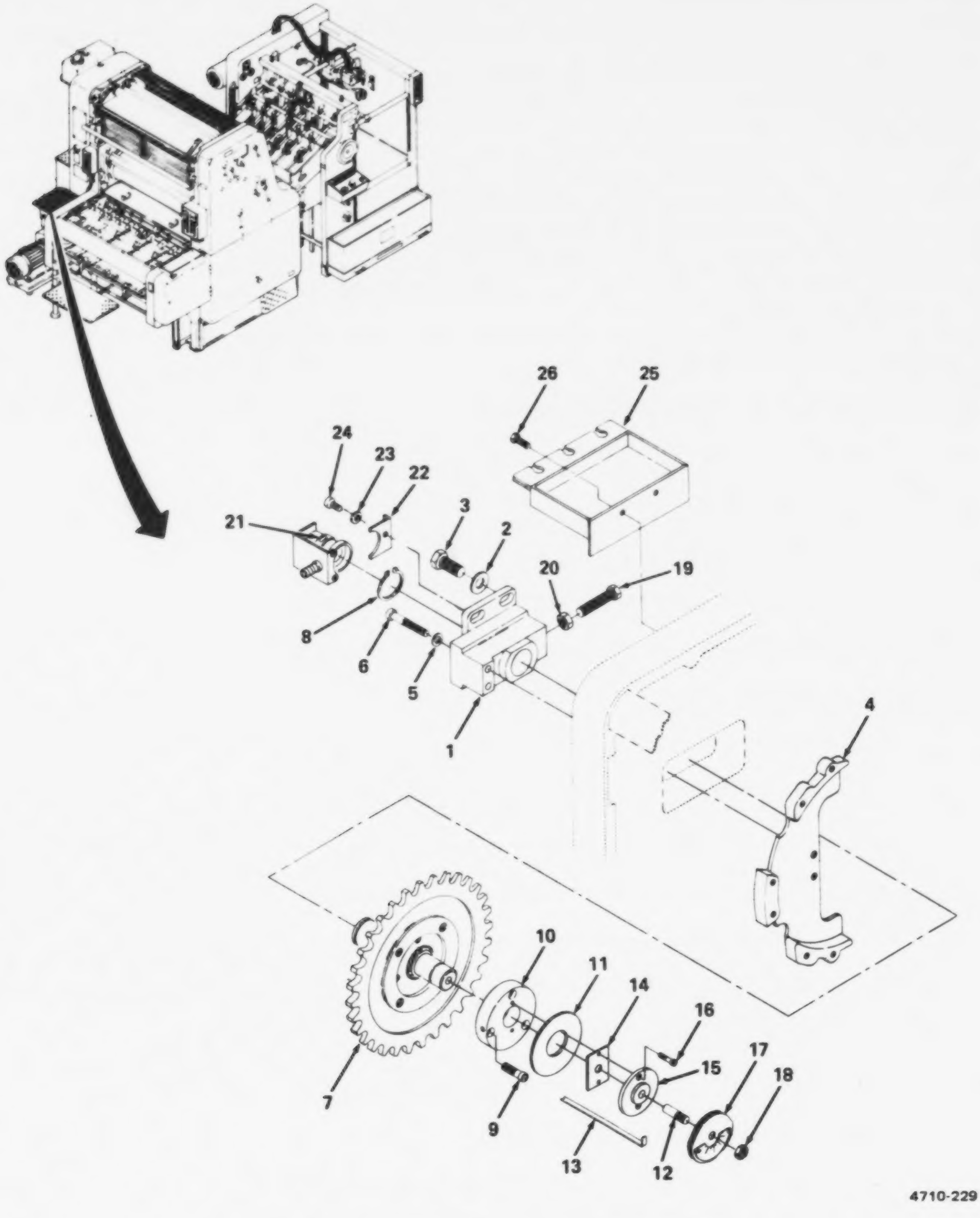
(8) Tighten tensioning screw (19) and lock nut (20).

(9) Install tacho dynamo (21), clamp (22), washer (23), and screw (24).

(10) Install tool tray (25) on press side plate and replace two hex-head screws (26).

NOTE

FOLLOW-ON MAINTENANCE:
(1) Install delivery plexiguard (para. 2-21).
(2) Close lower guard door (O/S) (para. 2-19).
(3) Install dust catcher (para. 2-53).
(4) Install delivery grippers (para. 2-57).
(5) Adjust delivery gripper chain tension (para. 2-57).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4710-229

Figure 2-139. Chain Sprocket Assembly Installation.

2-62. Cam Lever Assembly.

This task covers: a. Remove b. Repair c. Install

INITIAL SETUP

Tools	*Equipment Conditions*
Ball-peen hammer	Delivery sheet stop assembly removed (para. 2-55)
6 mm pin punch	Lower guard door (O/S) open (para. 2-19)
10 mm combination wrench	Delivery plexiguard removed (para. 2-21)
5 mm hex key	

a. Remove. (figure 2-140)

(1) Loosen hex nut (1) and socket-head screw (2).

(2) Remove end of tension spring (3) from screw (2).

(3) Remove taper pin (4) and lever (5).

(4) Remove two taper pins (6).

(5) Remove grease fitting (7) and retaining ring (8).

(6) Slide shaft (9) out through O/S side frame and slide levers (10) off of shaft (9).

b. Repair. (figure 2-140)

(1) Remove pin (11) and roller (12).

(2) Remove hex nut (13), stop nut (14), washer (15), and lever stop (16).

(3) Remove screw (17) and tension spring (3).

(4) Remove retaining ring (18), washer (19), pin (20), and bearing (21).

(5) Remove bearings (22) from side frames.

(6) Replace binding bearings, broken tension spring, damaged or missing roller or lever stop.

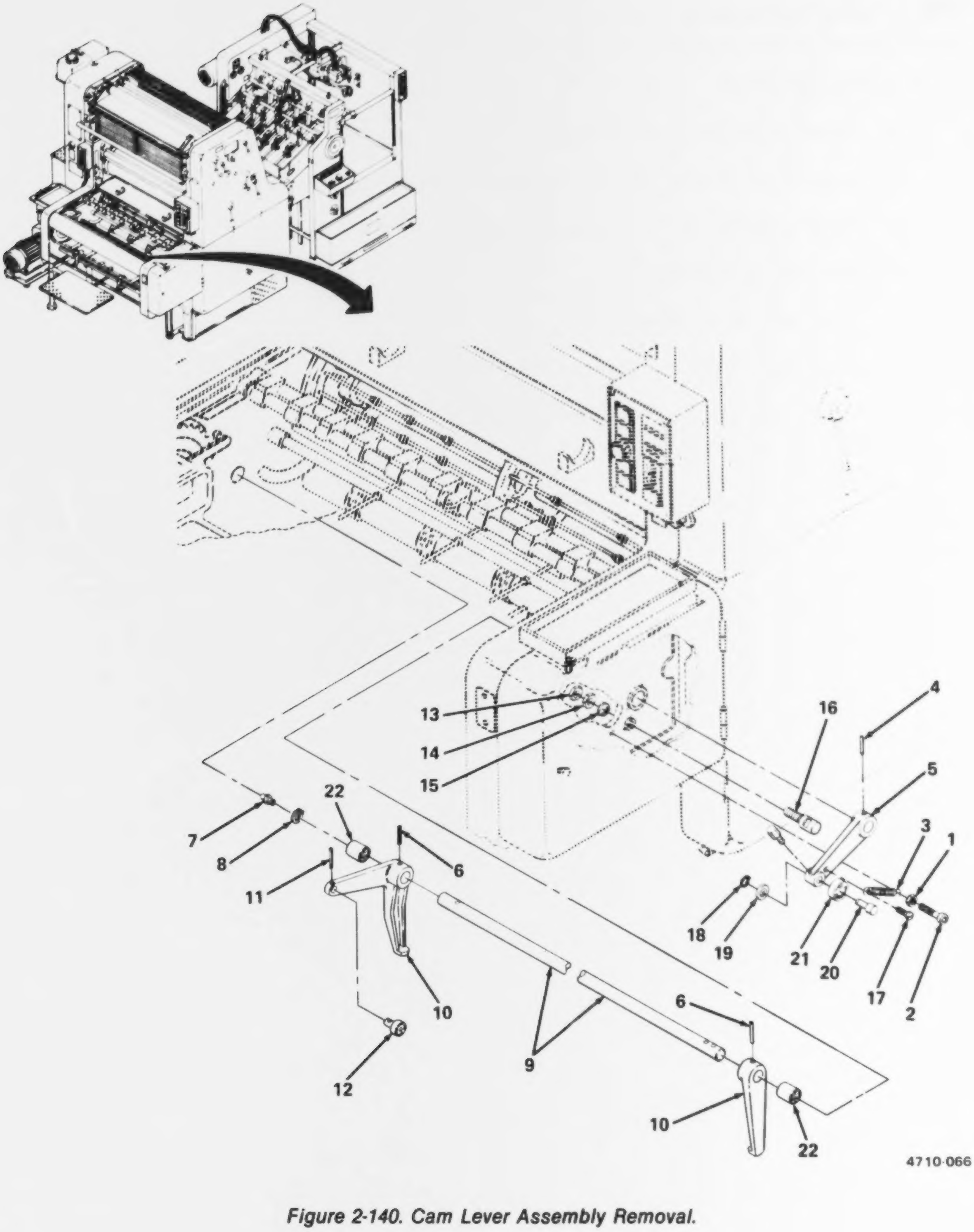
(7) Press bearings (22) into side frames.

(8) Replace bearing (21), pin (20), washer (19), and retaining ring (18).

(9) Replace tension spring (3) and screw (17).

(10) Replace lever stop (16), washer (15), stop nut (14), and hex nut (13).

(11) Replace pin (11) and roller (12).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4710-066

Figure 2-140. Cam Lever Assembly Removal.

2-62. Cam Lever Assembly (cont).

c. *Install.* (figure 2-141)

(1) Install shaft (1) into O/S side frame.

(2) Install levers (2), outer shaft (1), and replace shaft into D/S side frame.

(3) Install retaining ring (3) and grease fitting (4).

(4) Install two taper pins (5).

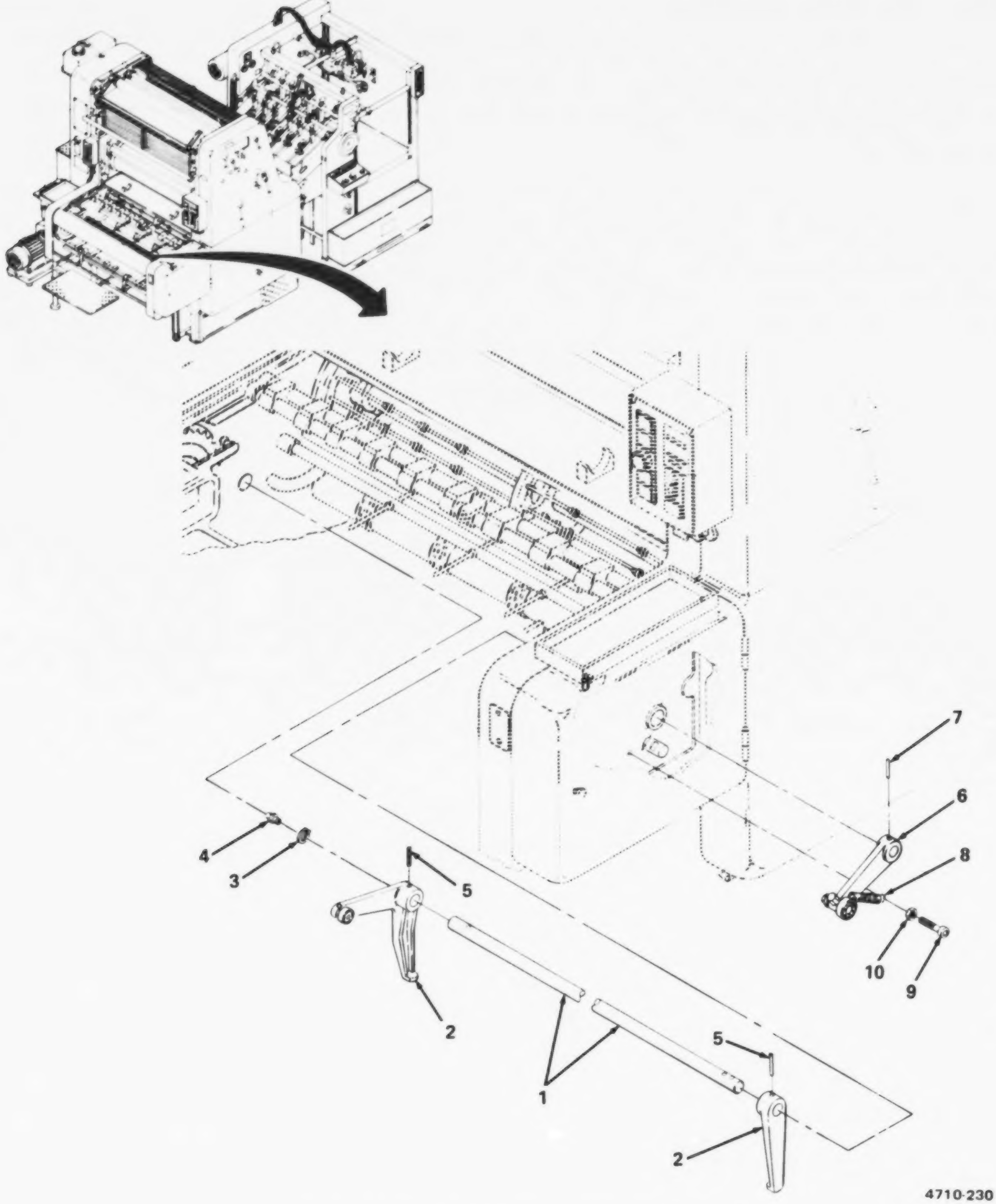
(5) Install lever (6) and taper pin (7).

(6) Install end of tension spring (8) on screw (9).

(7) Tighten socket-head screw (9) and hex nut (10).

NOTE

FOLLOW-ON MAINTENANCE:
(1) Replace delivery sheet stop (para. 2-55).
(2) Replace delivery plexiguard (para. 2-21).
(3) Close lower guard (O/S) door (para. 2-19).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4710-230

Figure 2-141. Cam Lever Assembly Installation.

2-63. Trip Block Assembly.

This task covers: a. Service b. Remove c. Repair d. Install

INITIAL SETUP

Tools	*Equipment Conditions*
3 mm hex key 10 mm combination wrench 8 mm combination wrench 7 mm combination wrench	Delivery plexiguard removed (para. 2-21) Lower guard (O/S) door open (para. 2-19)

a. Service. Lubricate at grease point (LO 5-3610-286-12).

b. Remove. (figure 2-142)

(1) Loosen two locknuts (1) and remove two hex-head screws (2) and tension spring (3).

(2) Loosen socket-head set screw (4) and remove lever (5).

(3) Remove two hex-head screws (6) and trip block assembly (7).

(4) Remove two stop screws (8).

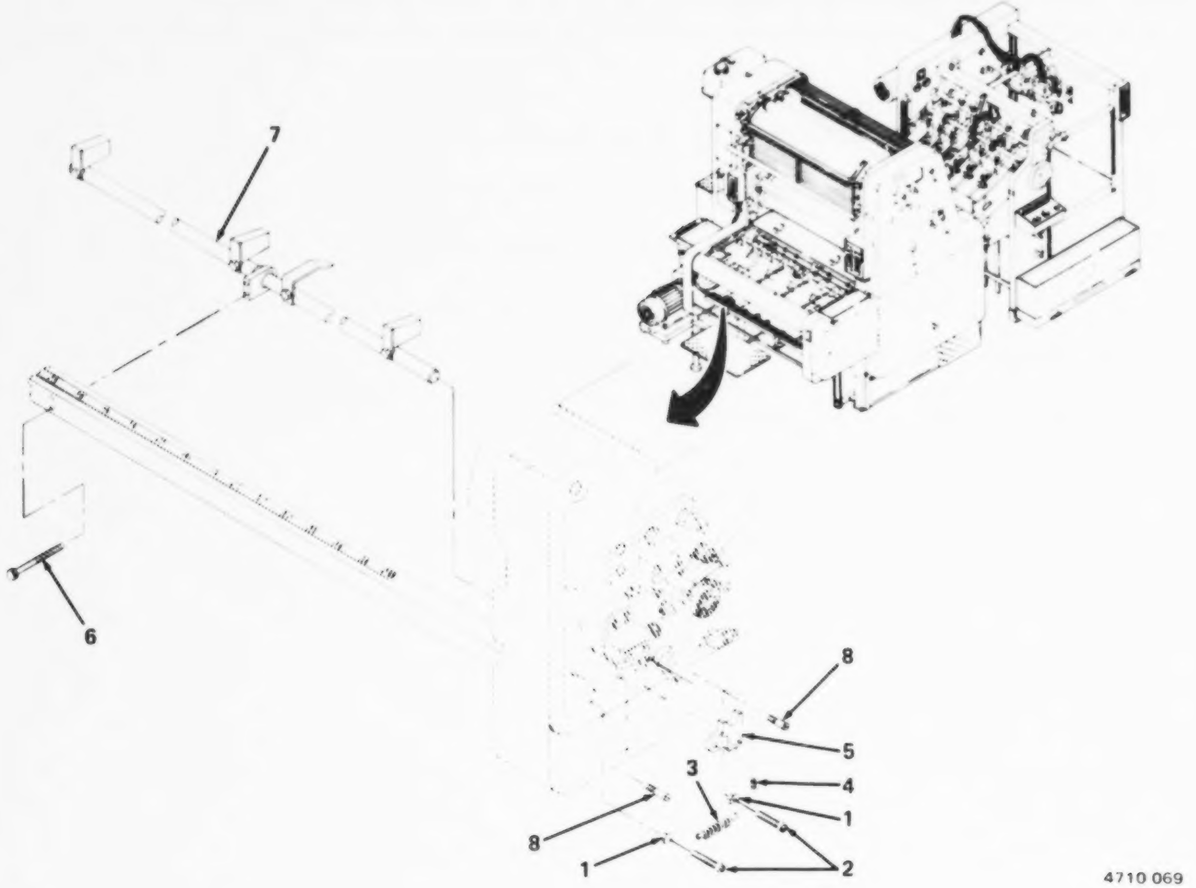
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Figure 2-142. Trip Block Assembly Removal.

2-63. Trip Block Assembly (cont).

c. *Repair.* (figure 2-143)

(1) Remove four hex-head screws (11) and four trip blocks (2).

(2) Remove retaining ring (3), washer (4), and center support (5).

(3) Replace missing or damaged trip blocks from support rod (6).

(4) Replace retaining ring (3), washer (4), and center support (5) onto support rod (6).

(5) Replace four trip blocks (2) and four hex-head screws (1).

(6) Replace weak or broken spring.

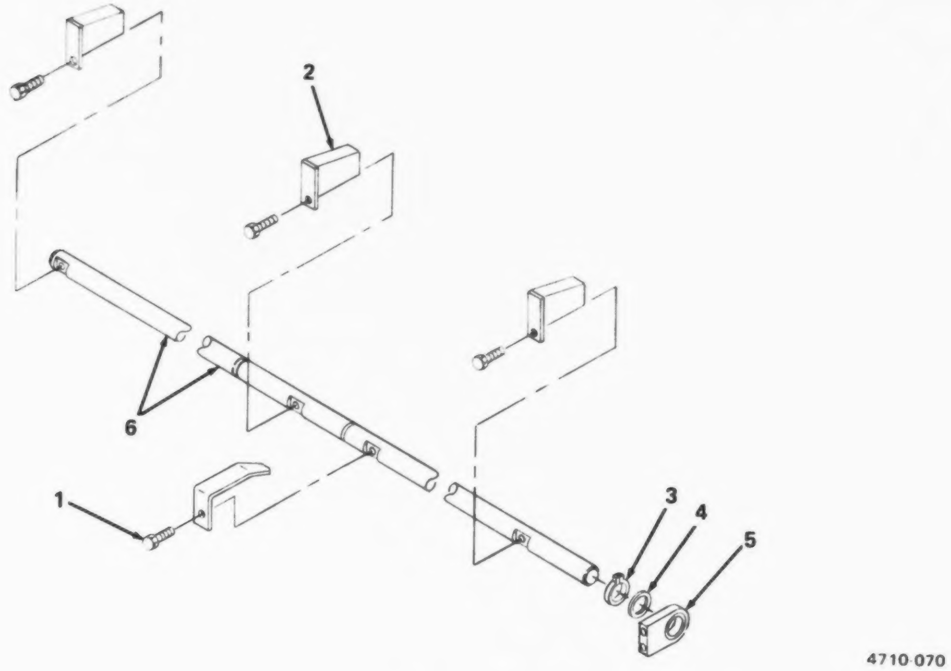


Figure 2-143. Trip Block Assembly Repair.

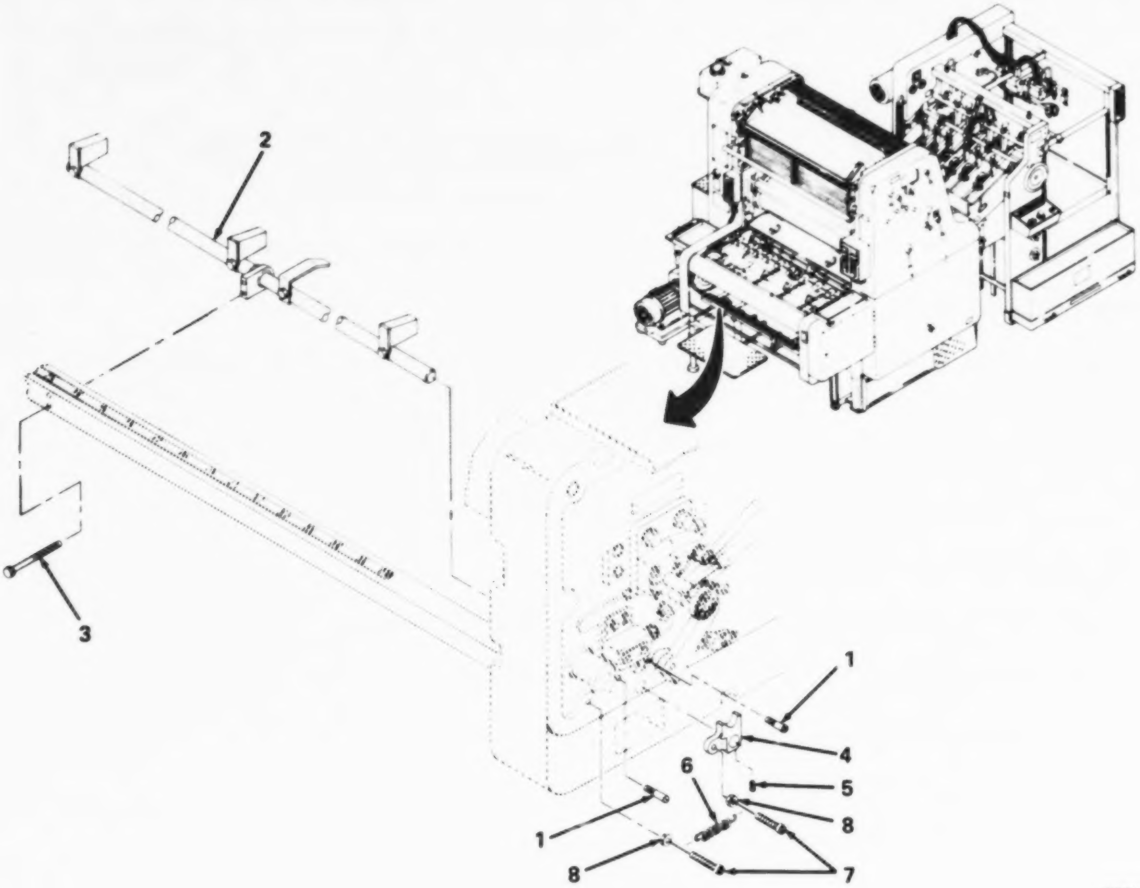
d. *Install.* (figure 2-144)

(1) Install two stop screws (1).

(2) Install trip block assembly (2) and secure by replacing two hex-head screws (3).

(3) Install lever (4) and socket-head set screw (5).

(6) Install tension spring (6), two hex-head screws (7) and two locknuts (8) and tighten locknuts.



4710-231

Figure 2-144. Trip Block Assembly Installation.

NOTE

FOLLOW-ON MAINTENANCE:
(1) Install delivery plexiguard (para. 2-21).
(2) Close lower guard (O/S) door (para. 2-19).

2-64. Delivery Pile Lift Motor.

This task covers: a. Remove b. Repair c. Install d. Adjust

INITIAL SETUP

Tools

17 mm combination wrench
0.050 x 0.375 x 8 in. flat-tip screwdriver
10 mm hex key

Equipment Conditions

Suction slowdown assembly must be moved fully toward delivery end of press (para. 2-57)
Suction valve assembly removed (para. 2-48)
Electronic control box removed (para. 2-92)

Additional Personnel Requirement

Electrician MOS 35E20

General Safety Instructions

WARNING

HEAVY EQUIPMENT. Use care and proper lifting techniques when removing or installing delivery pile motor. Failure to do so may result in serious personal injury.

a. Remove. (figure 2-145)

(1) Remove four slotted screws (1) and terminal box and cover (2).

(2) Remove five hex nuts (3) and tag and remove leads (4).

(3) Remove slotted ground screw (5) and ground lead (6).

(4) Support pile lift motor (7) with wooden blocks.

WARNING

Motor exceeds 35 pounds. Use two persons to remove.

(5) Remove hex bolts (8), lockwasher (9), socket-head bolt (10), and lockwasher (11) from pile motor mounting plate (12).

(6) Carefully remove pile lift motor (7) through feeder end of press (O/S).

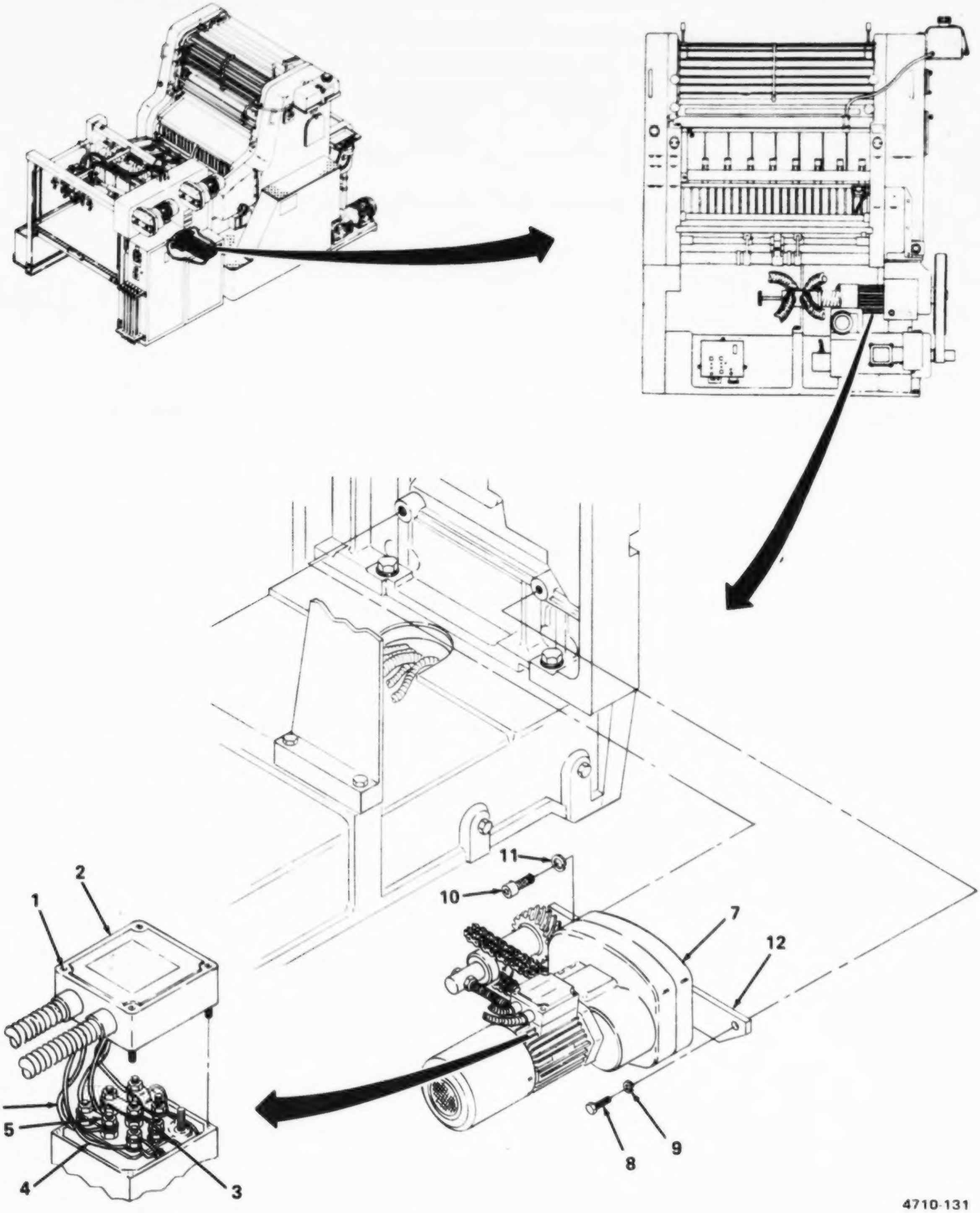

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Figure 2-145. Delivery Pile Lift Motor Removal.

2-64. Delivery Pile Lift Motor (cont).

b. Repair. (figure 2-146)

(1) Remove hex-head bolt (1), lockwasher (2), and washer (3).

(2) Remove hex nut (4), two stop nuts (5), and support spindle (6).

(3) Remove spacer (7), axial bearing (8), spacer (9), needle bearing (10), gear and sprocket assembly (11), and needle bearing (12) from shaft (13).

(4) Remove grease fitting (14).

(5) Remove three slotted screws (15), cover (16), and plastic fan (17).

(6) Tag and remove magnetic brake leads (red, yellow) (18) from terminals in terminal box (19).

(7) Remove three socket-head screws (20), washers (21), and magnetic brake s9 (22).

(8) Remove two hex-head bolts (23), lockwashers (24), and mounting plate (25) from pile lift motor (26).

(9) Replace worn or damaged binding on inoperative components.

(10) Replace mounting plate (25), two hex-head bolts (23) and lockwashers (24) on pile lift motor (26).

(11) Replace magnetic brake s9 (22) on shaft of pile lift motor (26) and replace three washers (21) and three socket-head screws (20).

(12) Thread magnetic brake leads (18) through hole in terminal box (19) and replace tagged red and yellow leads on terminals. Remove tags.

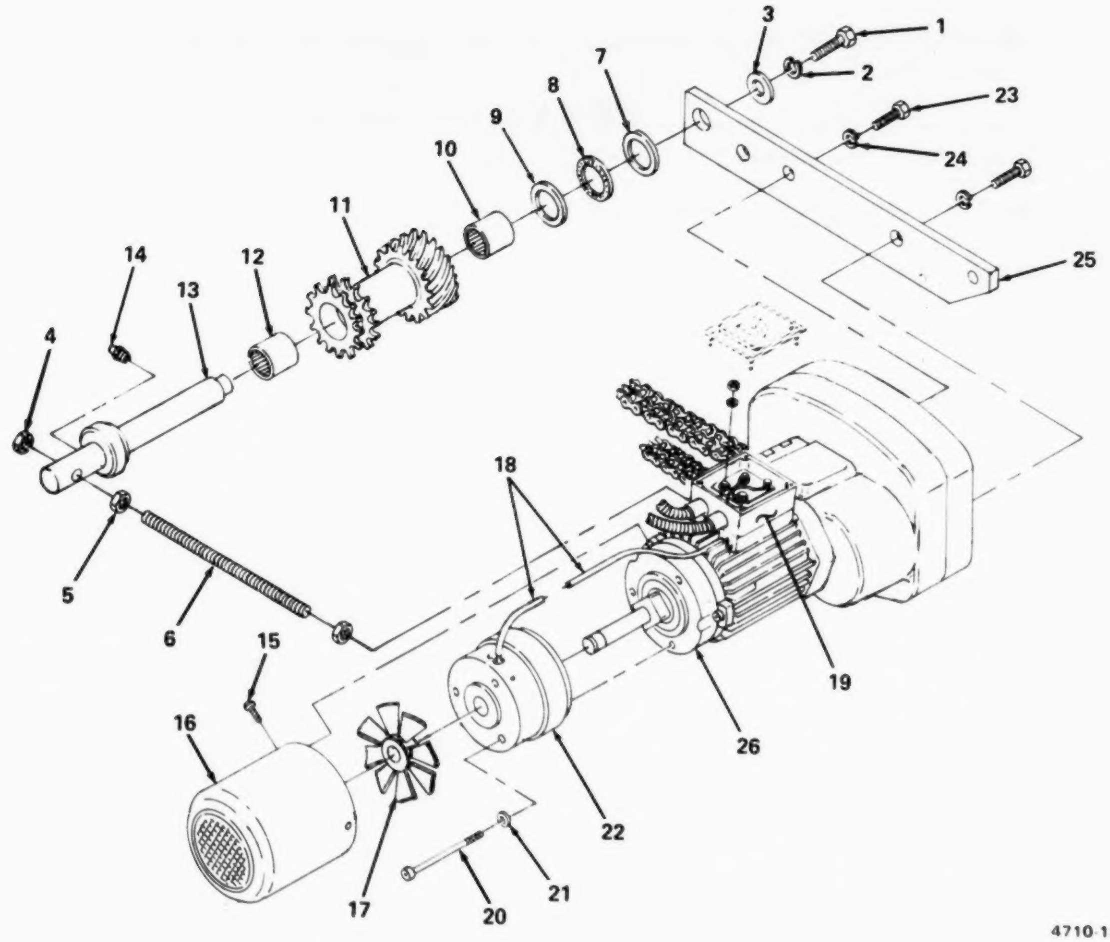
(13) Replace plastic fan (17), cover (16), and three slotted screws (15).

(14) Replace grease fitting (14).

(15) Replace needle bearing (12), gear and sprocket assembly (11), needle bearing (10), spacer (9), axial bearing (8), and spacer (7) on shaft (13).

(16) Replace support spindle (6) and stop nuts (5) on shaft (13) and pile lift motor (26) and replace hex nut (4).

(17) Replace washer (3), lockwasher (2), and hex-head bolt (1) to shaft (13) through hole in mounting plate (24).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4710-132

Figure 2-146. Delivery Pile Lift Motor Repair.

2-64. Delivery Pile Lift Motor (cont).

c. *Install.* (figure 2-147)

(1) Replace pile lift motor (1) on wooden supports under press.

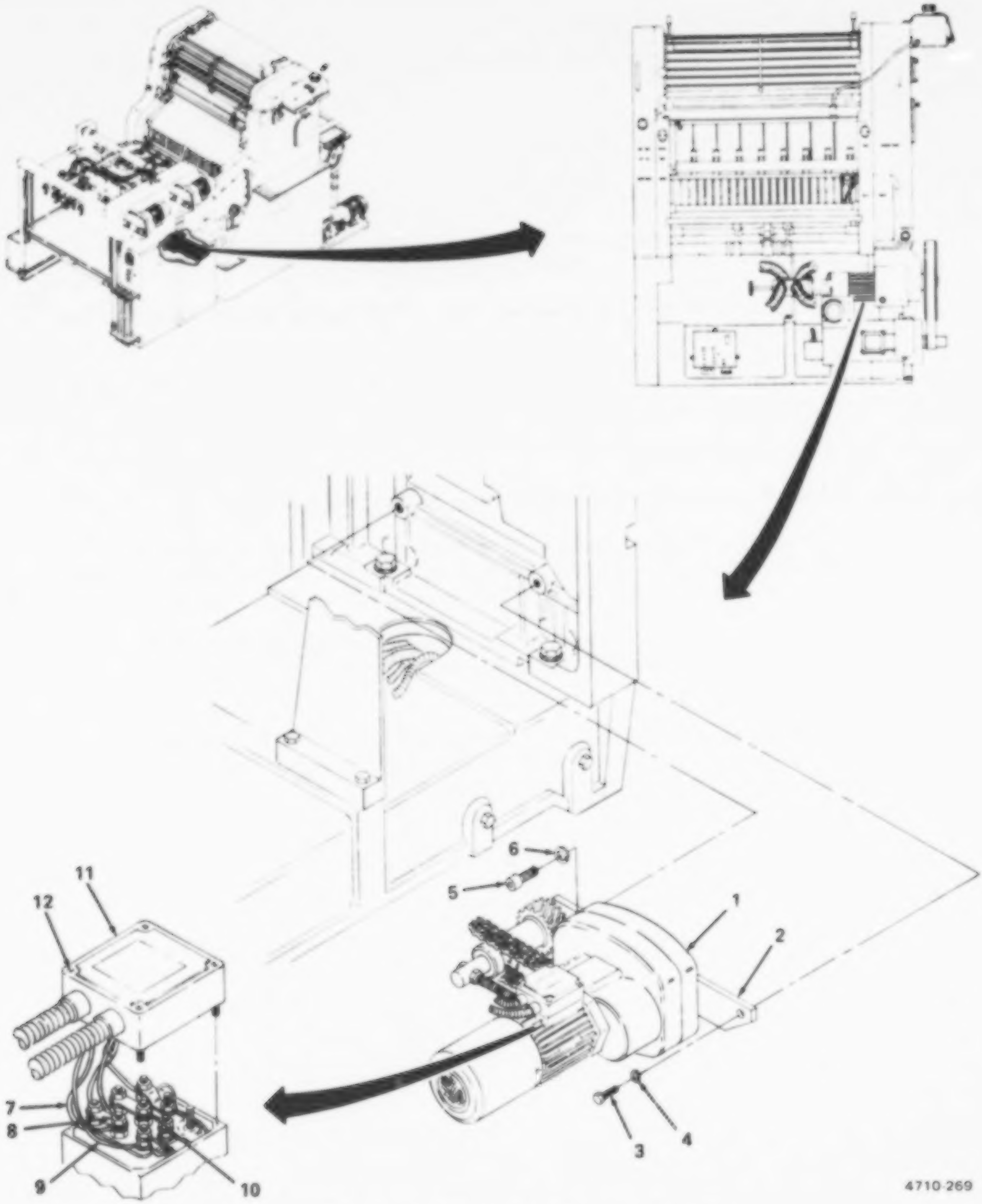
(2) Slide pile lift motor (1) through O/S and carefully mesh sprocket drive gear with delivery chain drive gear.

(3) Aline mounting plate (2) holes with holes in press D/S side frame and install hex bolt (3), lockwasher (4), socket-head bolt (5), and lockwasher (6).

(4) Install ground lead (7) and slotted ground screw (8).

(5) Install five tagged leads (9) and hex nuts (10).

(6) Install terminal box and cover (11) and four slotted screws (12).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4710-269

Figure 2-147. Delivery Pile Lift Motor Installation.

2-64. Delivery Pile Lift Motor (cont).

d. *Adjust.* (figure 2-148)

(1) ***Chain guide and cover alinement.*** (figure 2-148)

(a) Loosen chain guide (1) by loosening two hex-head bolts (2).

(b) Aline chain guide (1) so that it is exactly vertical and centered between D/S and O/S sides of roller chain (3), and tighten hex-head bolts (2).

(c) Mount chain cover in its two alinement holes on chain support (5), and secure with two hex-head bolts (6).

(d) Aline chain cover (4) so that there is a 1 mm clearance with roller chain (3) and tighten hex bolts (6).

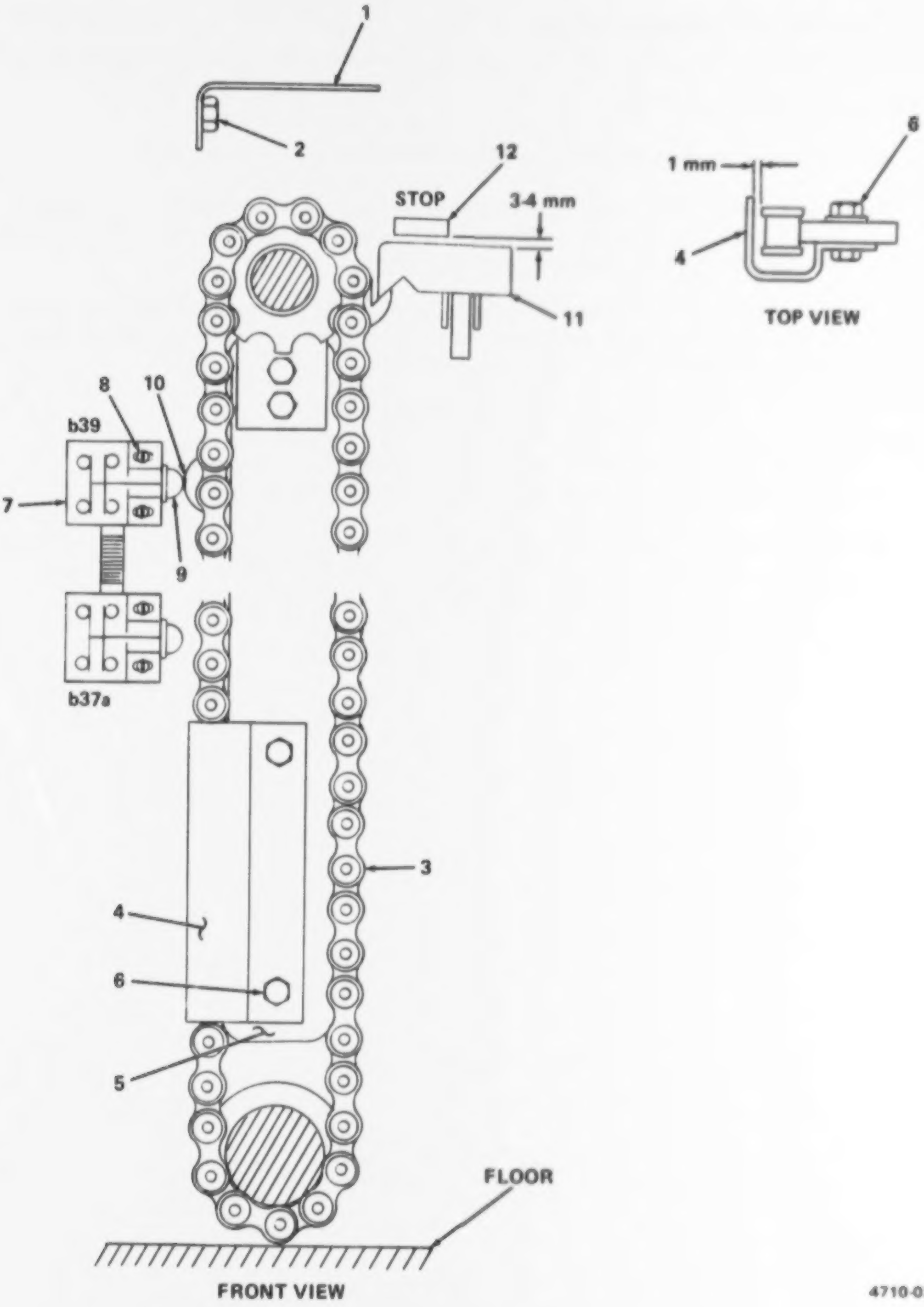
(2) ***Upper limit.*** (figure 2-148)

(a) Loosen upper limit switch b39 (7) by loosening two slotted screws (8).

(b) Adjust limit switch (7) to roller chain (3) so that the switch plunger (9) just makes contact with the lower part of the chain cam segment (10), 4 to 5 mm above the bottom end of the cam. Tighten two switch mounting screws (8).

(c) Install delivery truck (11) into delivery end of press and press PILE UP pushbutton to raise truck until cam segment (10) of roller chain (3) is 10 to 15 mm below contact with limit switch plunger (9).

(d) Inch pile upward until limit switch (7) operates. Check for 3 to 4 mm clearance between truck (11) and truck stop (12). If clearance is incorrect, adjust limit switch (7) mounting plate upward or downward as required.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FLOOR
FRONT VIEW

4710-035.1

Figure 2-148. Delivery Pile Lift Upper Limit Adjustment.

2-64. Delivery Pile Lift Motor (cont).

(3) *Lower limit.* (figure 2-149)

(a) Loosen lower limit switch b37a (1) by loosening two slotted screws (2).

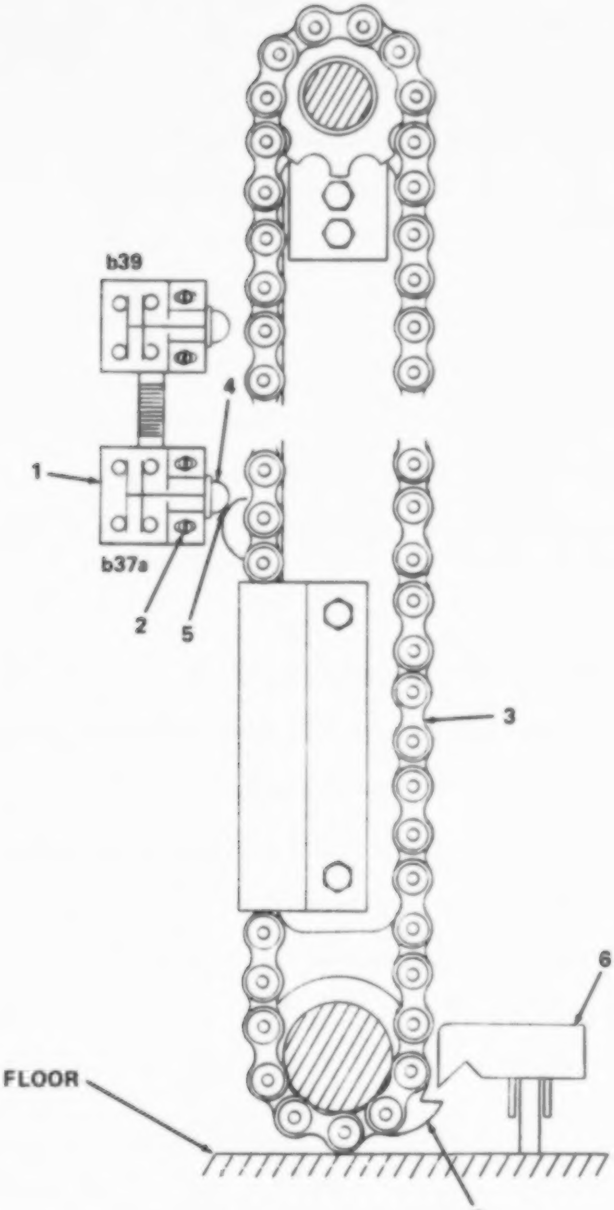
(b) Adjust limit switch (1) to roller chain (3) so that the switch plunger (4) just makes contact with the upper part of the chain cam segment (5) 4 to 5 mm below the top end of the cam. Then tighten switch mounting screws (2).

(c) Press PILE DOWN pushbutton to lower truck (6) until it is touching the floor. Check that limit switch (1) operates when chain hooks (7) have completely released and cleared the delivery truck (6).

CAUTION

Delivery truck should slide in and out freely, clearing the delivery hooks in lower limit position. Hooks must not be so low that they hit the floor.

(d) If lower limit is incorrect, adjust limit switch (1) mounting plate upward or downward.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4710-035.2

Figure 2-149. Delivery Pile Lift Lower Limit Adjustment.

2-65. Cylinder Safety Guard Assembly.

This task covers: a. Test b. Remove c. Install d. Aline

INITIAL SETUP

Tools

5 mm hex key
0.050 x 0.375 x 8 in. flat-tip screwdriver
No. 3 x 6 in. cross-tip screwdriver
10 mm combination wrench

Additional Personnel Requirement

Electrician MOS 35E20

a. *Test.*

(1) With safety guard in closed position, turn press on. Press should begin operating.

(2) With press running, lift safety guard. Press should stop running instantly.

(3) If press does not respond as described in steps (1) and (2), perform continuity test as described in paragraph 2-16. Aline or replace switch as required.

b. *Remove.* (figure 2-150)

(1) Unlock two turnlock fasteners (1) and remove safety guard (2).

(2) Remove four rivets (3), four cap screws (4), four flat washers (5), and two guards (6).

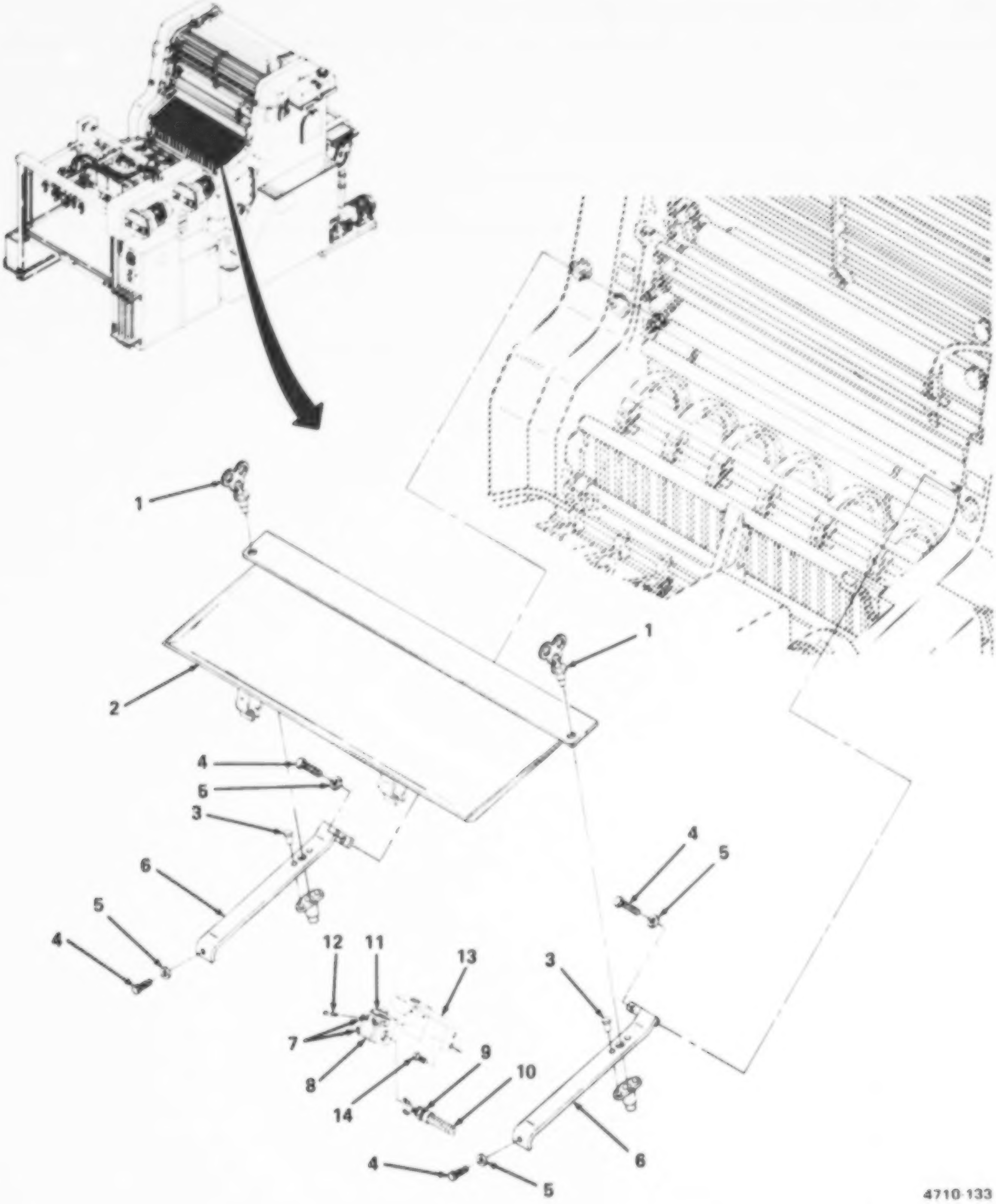
(3) Remove two screws (7) from switch cover (8) and open cover.

(4) Tag wires for position identification and disconnect wires from switch terminals.

(5) Loosen lock nut (9) and slide cable (10) out of switch (11).

(6) Remove two screws (12) and remove switch (11) from bracket (13).

(7) Remove two bolts (14) and remove bracket (13).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4710-133

Figure 2-150. Cylinder Safety Guard Assembly Removal.

2-65. Cylinder Safety Guard Assembly (cont).

c. *Install.* (figure 2-151)

(1) Install bracket (1) with two bolts (2).

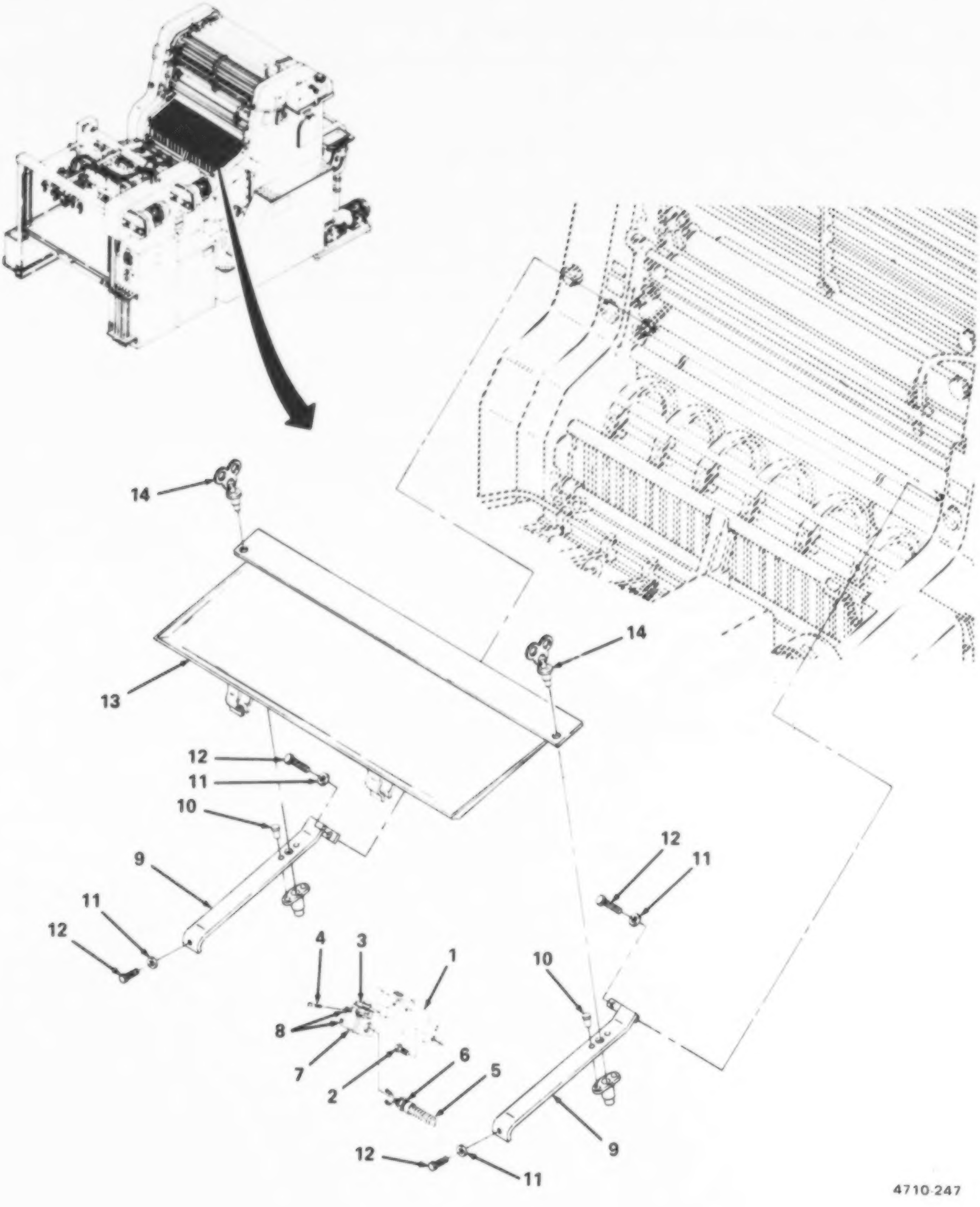
(2) Install switch (3) on bracket (1) with two screws (4).

(3) Install cable (5) into switch (3) and connect wires to terminals as tagged. Tighten lock nut (6) and remove tags.

(4) Close cover (7) and secure with two screws (8).

(5) Install both guards (9) with four rivets (10), four flat washers (11), and four cap screws (12).

(6) Install safety guard (13) with two turnlock fasteners (14).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4710-247

Figure 2-151. Cylinder Safety Guard Assembly Installation.

2-65. Cylinder Safety Guard Assembly (cont).

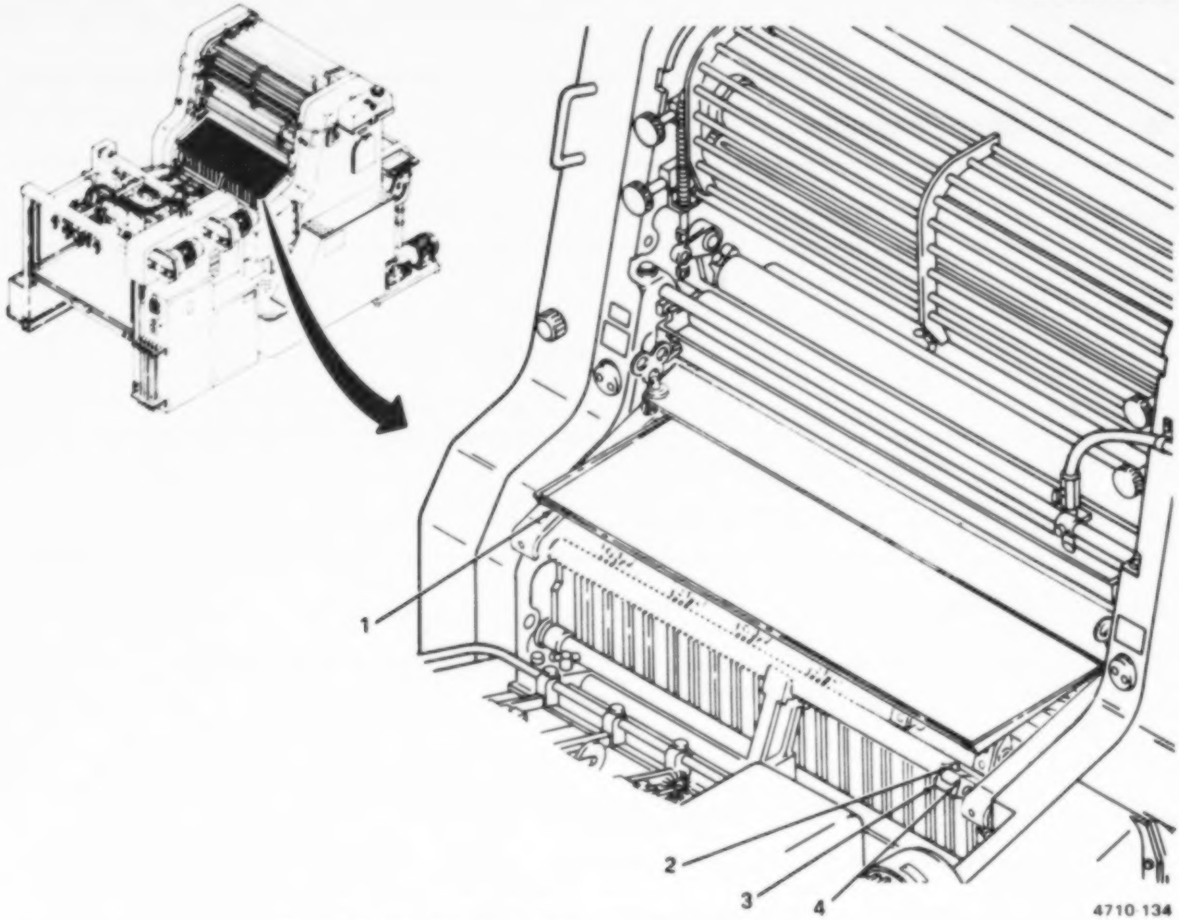
d. Aline. (figure 2-152)

WARNING

EXPOSED MOVING PARTS. All adjustments will be made while printing press is on SAFETY STOP except those authorized by this manual to be made with printing press running. Printing press must be on safe at all times when not in motion. Always shout "clear" and wait for "clear" response before taking printing press off safe to inch or run. Failure to follow this warning may result in serious injury.

(1) With safety guard (1) in closed position, verify that plunger (2) on limit switch (3) is fully depressed.

(2) Loosen screws (4) on limit switch (3) and slide switch up or down, as required, until full depression of plunger (2) is achieved by closing safety guard (1).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4710-134

Figure 2-152. Cylinder Safety Guard Assembly Alinement.

2-66. Cam Shaft Assembly.

This task covers: a. Remove b. Repair c. Install

INITIAL SETUP

Tools

8 mm hex key
13 mm combination wrench
17 mm combination wrench
6 mm pin punch
Ball-peen hammer

Equipment Conditions

Upper guard (O/S) removed (para. 2-18)
Lower guard (O/S) removed (para. 2-19)

a. Remove. (figure 2-153)

(1) Remove three socket-head screws (1), three washers (2), three hex-head screws (3), three washers (4), pin (5), flange (6), and cam (7).

(2) Remove two taper pins (8) and lever (9).

(3) Remove hex-head screw (10), hex nut (11), and spacer bushing (12).

(4) Remove hex-head screw (13), hex nut (14), two springs (15), and hex nut (16).

(5) Remove threaded pin (17), two threaded pins (18), and slide shaft (19) through O/S frame.

(6) Remove two cam levers (20) and two spacers (21) as shaft (19) passes through O/S frame.

(7) Remove taper pin (22), cam follower (23), and pin (24).

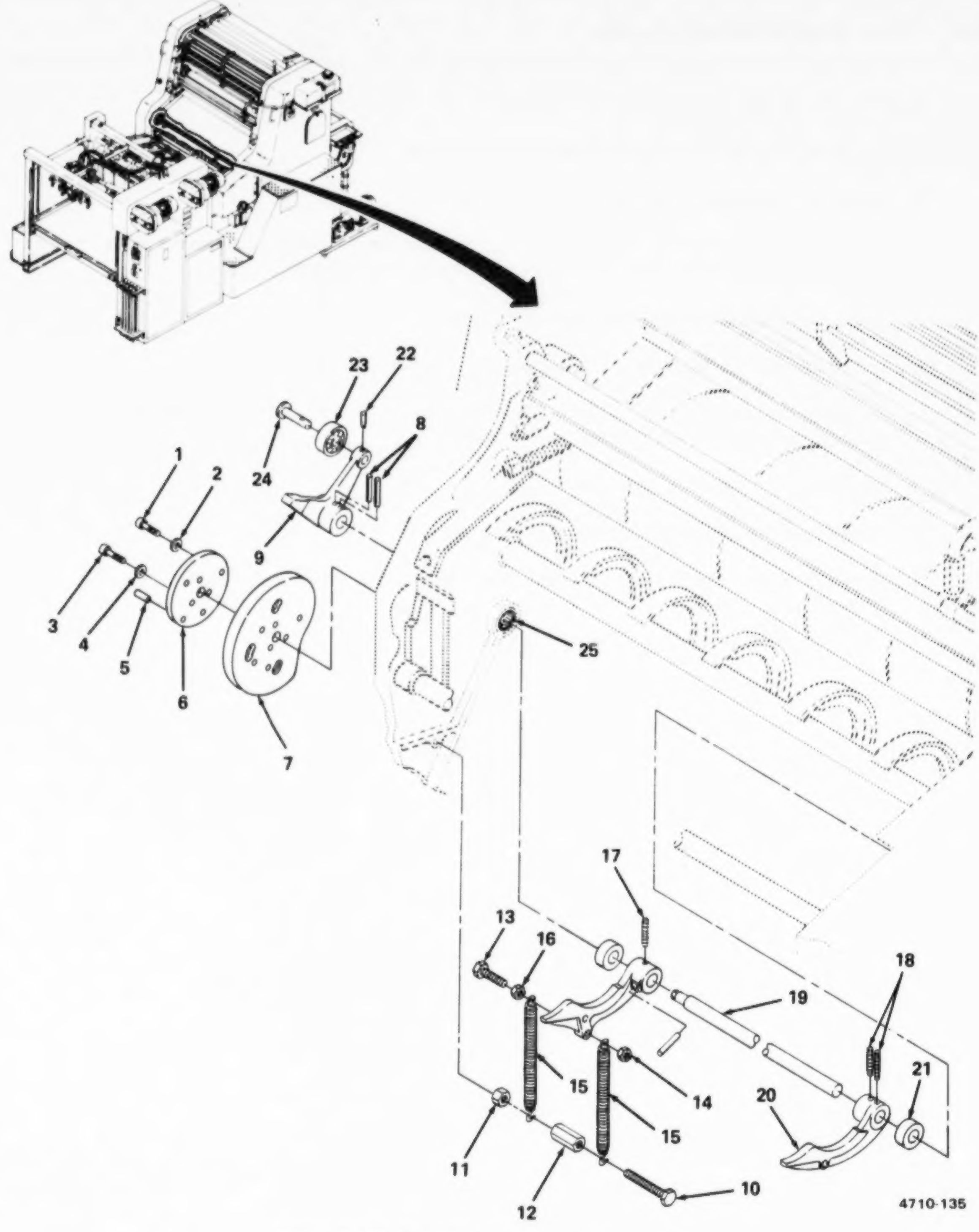
(8) Remove two needle bearings (25) from O/S and D/S frames.

b. Repair. (figure 2-153)

(1) Replace weak or broken springs (15).

(2) Replace frozen or binding bearings (26).

(3) Replace worn cam follower (24).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4710-135

Figure 2-153. Cam Shaft Assembly Removal.

2-66. Cam Shaft Assembly (cont).

c. *Install.* (figure 2-154)

(1) Install two needle bearings (1) in O/S and D/S frames.

(2) Install cam follower (2), pin (3), and taper pin (4).

(3) Slide shaft (5) through O/S frame, and install two spacers (6) and two cam levers (7) as shaft passes into press. Slide shaft fully into bearing on D/S frame.

(4) Install two threaded pins (8) and threaded pin (9).

(5) Install hex nut (10), hex screw (11), two springs (12), and hex nut (13).

(6) Install hex-head screw (14), spacer bushing (15), and hex nut (16), and install end of hex-head screw (14) into threaded hole in O/S frame.

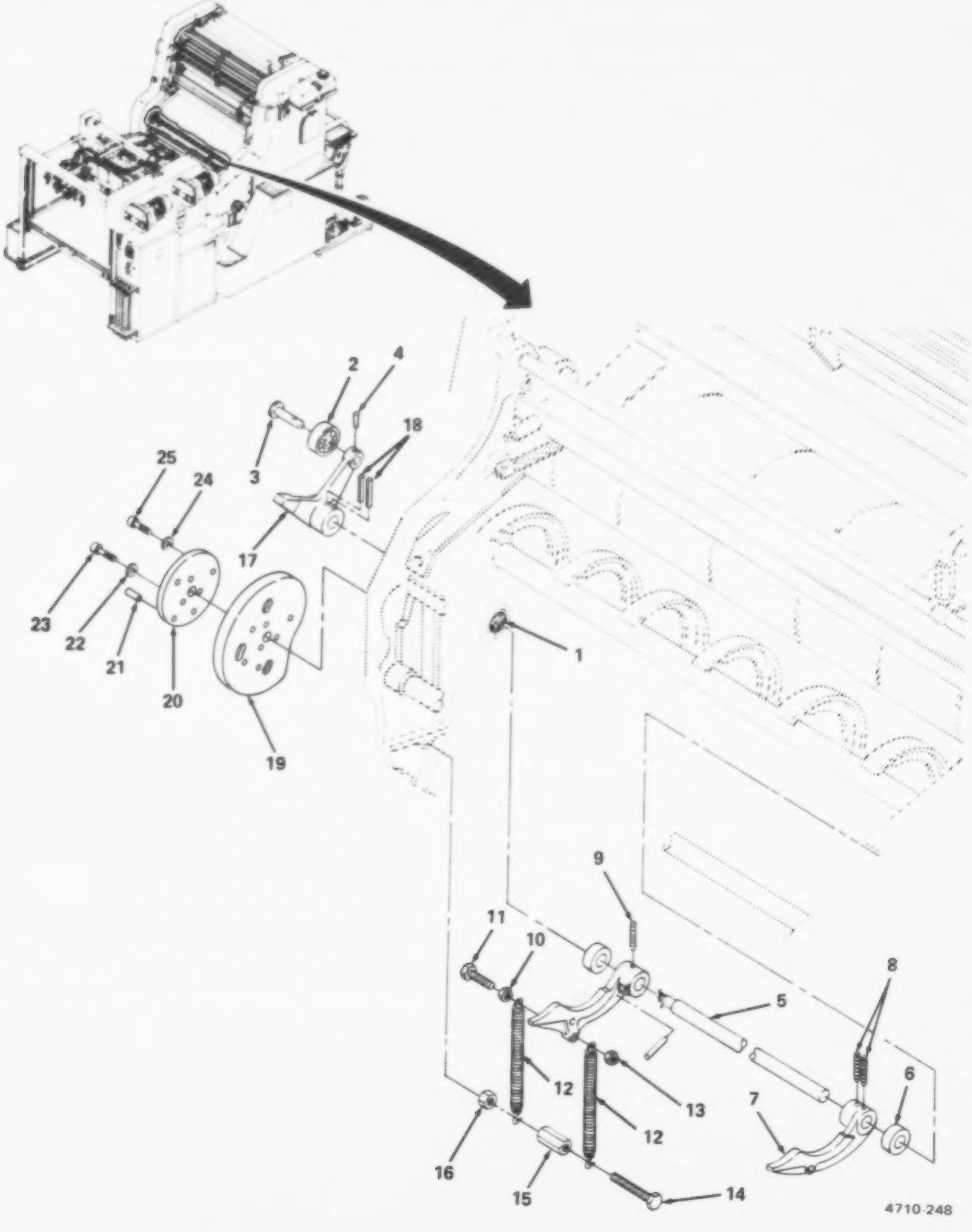
(7) Install lever (17) and two taper pins (18).

(8) Install cam (19) and flange (20) and aline with pin (21).

(9) Install three washers (22) and hex-head screws (23), and three washers (24) and socket-head screws (25).

NOTE

FOLLOW-ON MAINTENANCE:
(1) Install lower guard (O/S) (para. 2-19).
(2) Install upper guard (O/S) (para. 2-18).



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4710-248

Figure 2-154. Cam Shaft Assembly Installation.

2-67. Ranger Drum Shaft Assembly.

This task covers: a. Repair b. Adjust

INITIAL SETUP

Tools

7 mm combination wrench
17 mm combination wrench
22 mm combination wrench
6 mm hex key
6 mm pin punch
Ball-peen hammer
Retaining-ring pliers
Graduated disc
No. 2 x 4 in. cross-tip screwdriver

Equipment Conditions

Main guard (D/S) removed (para. 2-20)
Cylinder safety guard removed (para. 2-65)
Center support on pull side lay removed (para. 2-49)
Register feed guard (D/S) removed (para. 2-49)

---

a. *Repair.*

(1) *Disassembly.*

(a) *Drive gears.* (figure 2-155)

1 Set press to "O" position. Match mark all gears to ranger drum gear.

NOTE

Ranger drum shaft assembly should be rotated until compression springs on gripper bar are up and horizontal.

2 Remove retaining ring (1) and idler gear (2).

3 Remove four socket-head screws (3), ribbed washers (4), and gear (5). Replace worn or damaged gear.

4 Remove three socket-head screws (6), ribbed washers (7), and gear (8). Replace worn or damaged gear.

5 Remove tapered locator pin (9) and tapered locator pin (10).

6 Remove retaining ring (11) and flange (12). Replace damaged flange.

7 Remove woodruff key (13). Replace worn key.

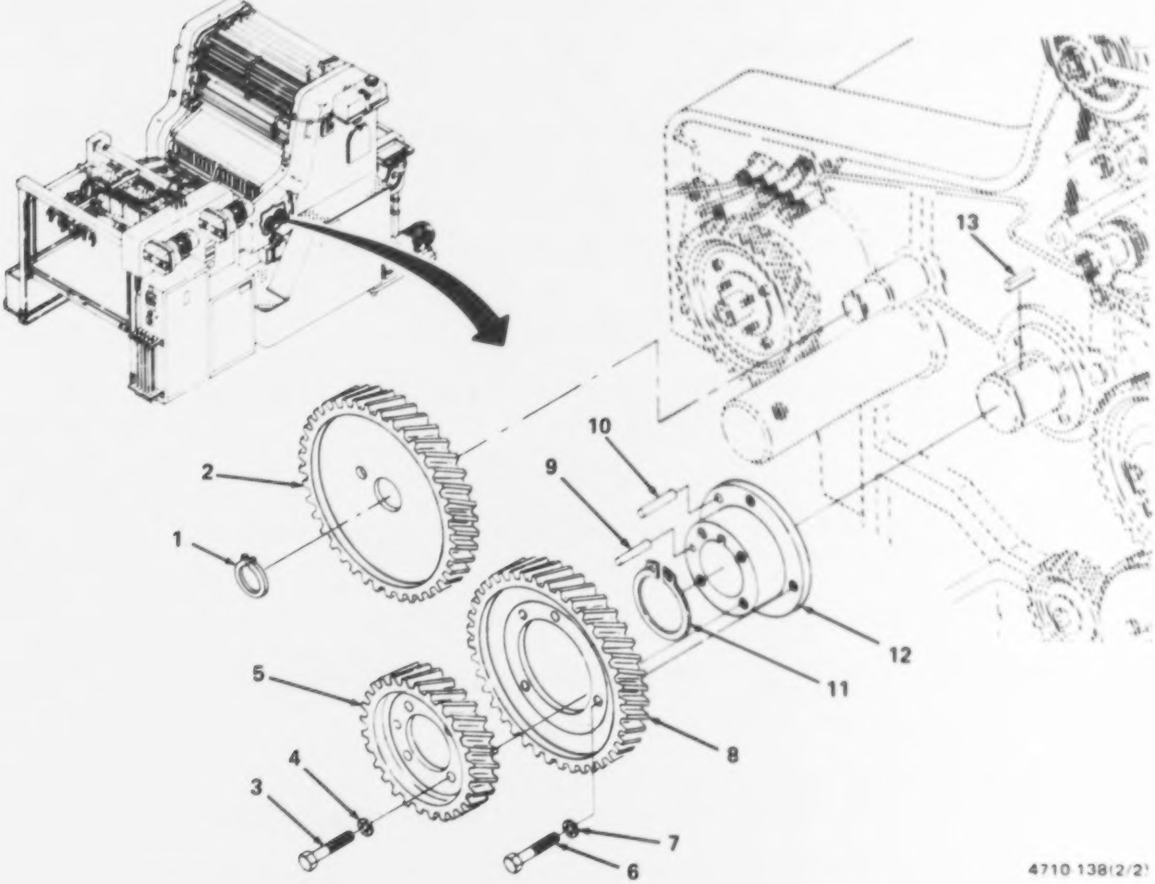
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Figure 2-155. Ranger Drum Drive Gears Disassembly.

2-67. Ranger Drum Shaft Assembly (cont).

(b) *Gripper bar.* (figure 2-156)

NOTE

Put press in "O" position. Turn gripper bar by hand so that cam followers line up with cavities in O/S and D/S frames.

1 Remove pin (1) and remove cam follower (2) by driving it out through hole in D/S side frame.

WARNING

Grippers must be facing up before attempting to remove gripper bar to relieve compression load on compression springs.

CAUTION

Steel pins are seated in aluminum gripper bar. Use care not to burr aluminum when removing or replacing pins.

2 Rotate gripper bar by hand turning the press until grippers are facing up.

3 Remove four tapered pins (3), six socket-head screws (4), and washers (5).

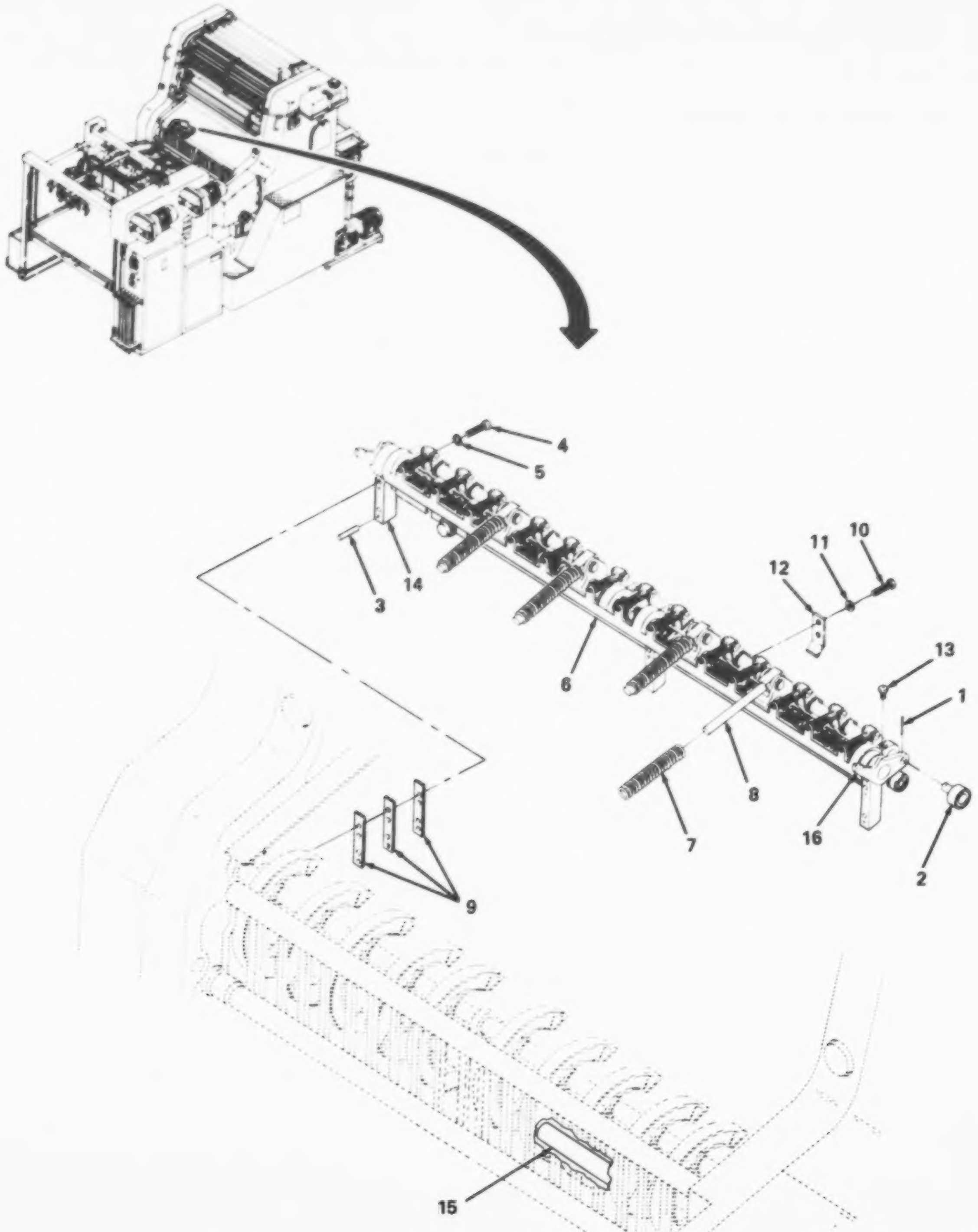
CAUTION

There are shims installed under the bearing brackets at each end of the gripper bar. Count shims and mark to assure that they are replaced correctly.

4 Lift out gripper bar (6), taking care not to drop compression springs (7) which are now loose on guide rods (8) and shims (9). Replace weak or broken springs (7). Replace damaged gripper bar (6).

5 For each individual gripper, remove hex-head cap screw (10), washer (11), and gripper pad (12). Replace individual damaged or deformed gripper pads.

6 Remove grease fitting (13). Replace clogged or damaged fitting.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4710-137

Figure 2-156. Ranger Drum Gripper Bar Disassembly.

2-67. Ranger Drum Shaft Assembly (cont).

(c) Sheet segment guides. (figure 2-157)

NOTE

Sheet segment guides are numbered 1 through 9, starting at O/S. Replace each guide in the same position as removed.

1 Rotate assembly to access hardware and remove socket-head screw (1) and washer (2) from segments 1, 3, 5, 7, and 9 (3).

2 Push laterally on segments and remove segments 1, 3, 5, 7, and 9 (3).

CAUTION

Segments 2, 4, 6, and 8 are under pressure from compressed springs.

3 Rotate assembly until gripper bar is positioned so that compression springs (4) are up and horizontal.

4 Loosen two hex-head screws (5) on spring rod guides (6) between sheet segments 2 and 4 (7).

5 Loosen socket-head screws (1) for sheet segments 2 and 4 (7).

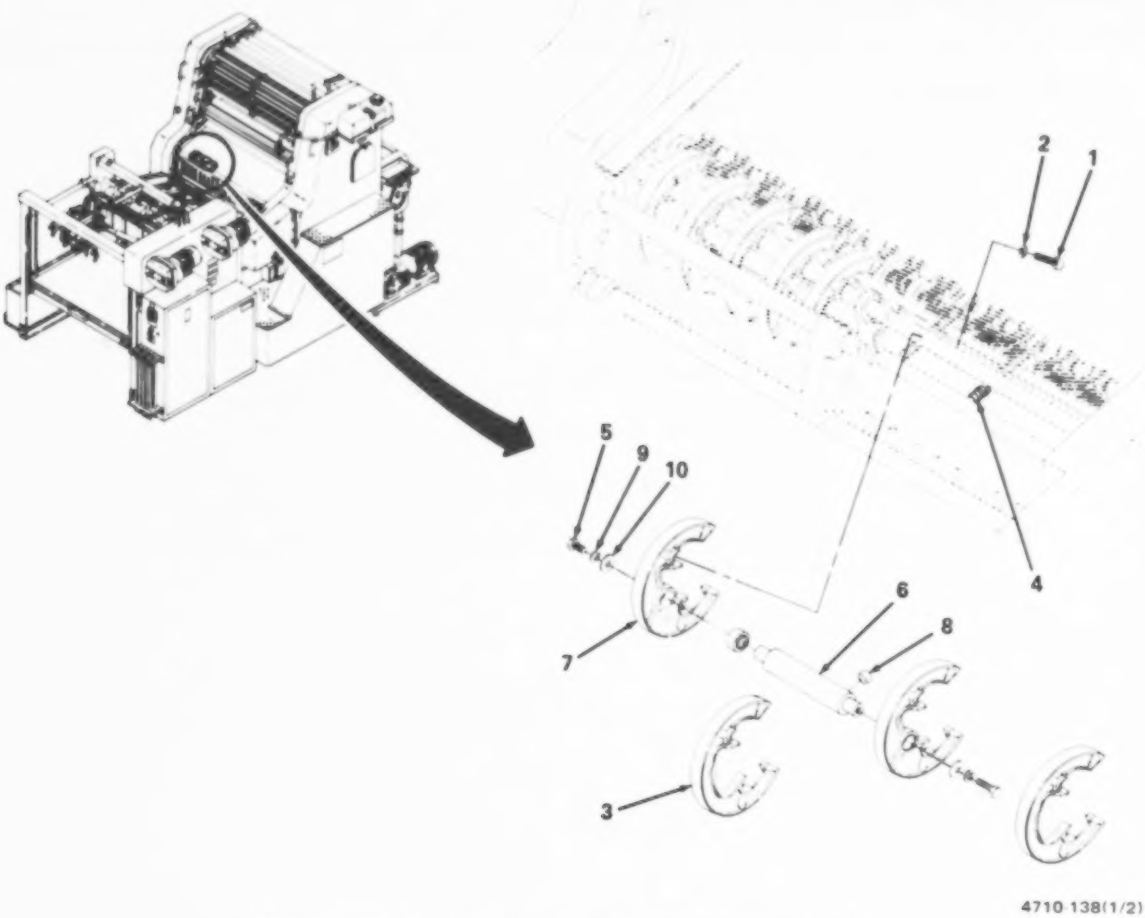
6 Carefully compress springs (4) off of sleeve guides (8) and remove springs (4).

7 Remove two hex-head screws (5), lockwashers (9), washers (10), and spring rod guides (6).

8 Remove socket-head screw (1) and washers (2) from segments 2 and 4, and remove segments (7).

9 Repeat steps 4 through 8 for sheet segments 6 and 8.

10 Replace damaged sheet segments.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4710-138(1/2)

Figure 2-157. Ranger Drum Sheet Segment Disassembly.

2-67. Ranger Drum Shaft Assembly (cont).

(2) *Assembly.*

(a) *Sheet segment guides.* (figure 2-158)

1 Replace segments 2 and 4 (1) and replace washers (2) and socket-head screws (3). Do not tighten screws.

2 Replace spring rod guide (4) between segments 2 and 4 (1) and lockwashers (5), washers (6), and replace hex-head screws (7). Do not tighten screws.

3 Replace springs (8) on sleeve guides (9).

4 Tighten screws (3, 7) on segments 2 and 4 (1).

5 Repeat steps 1 through 4 for segments 2 and 8.

6 Replace segments 1, 3, 5, 7, and 9 (10) and in turn, replace washers (2) and socket-head screws (3) for each.

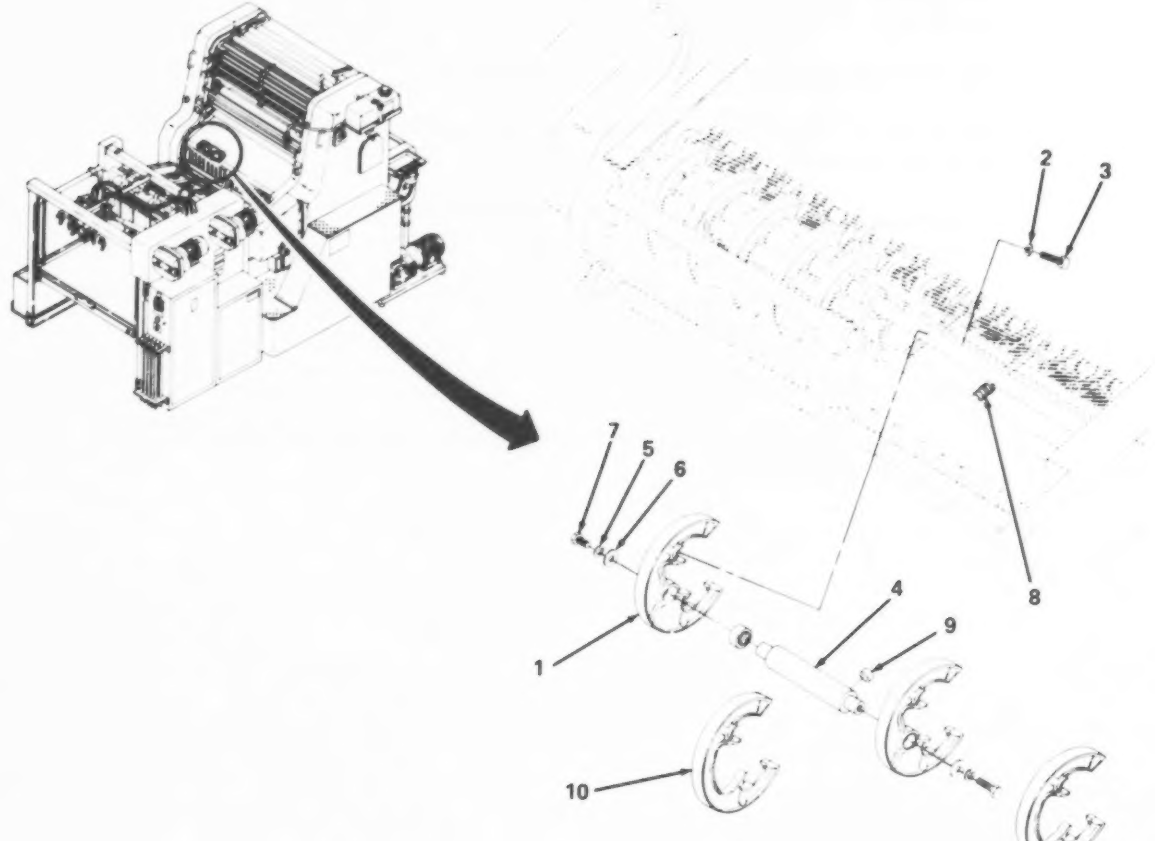
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Figure 2-158. Ranger Drum Sheet Segment Assembly.

2-67. Ranger Drum Shaft Assembly (cont).

(b) *Gripper bar.* (figure 2-159)

1 Replace grease fitting (1).

2 Replace each individual gripper pad (2), washer (3), and hex-head screw (4).

3 Position gripper bar (5) with gripper pad (2) up and spring guide rods (6) in horizontal position.

4 Replace four tapered pins (7) in bearing brackets (8).

5 Replace four tapered pins (7) to aline shims (9), replace shims (9), gripper bar (5), washers (10), and six socket-head screws (11).

6 Replace compression springs (12) on spring guide rods (6) and replace ends of spring guide rods (6) in rod guides (13).

7 Rotate gripper bar (5) by hand until cam follower (14) can be inserted through hole in D/S side frame into lever (15) on gripper bar (5).

8 Replace pin (16).

9 Turning ranger drum shaft assembly by hand, carefully guide cam follower (14) into D/S side frame cam.

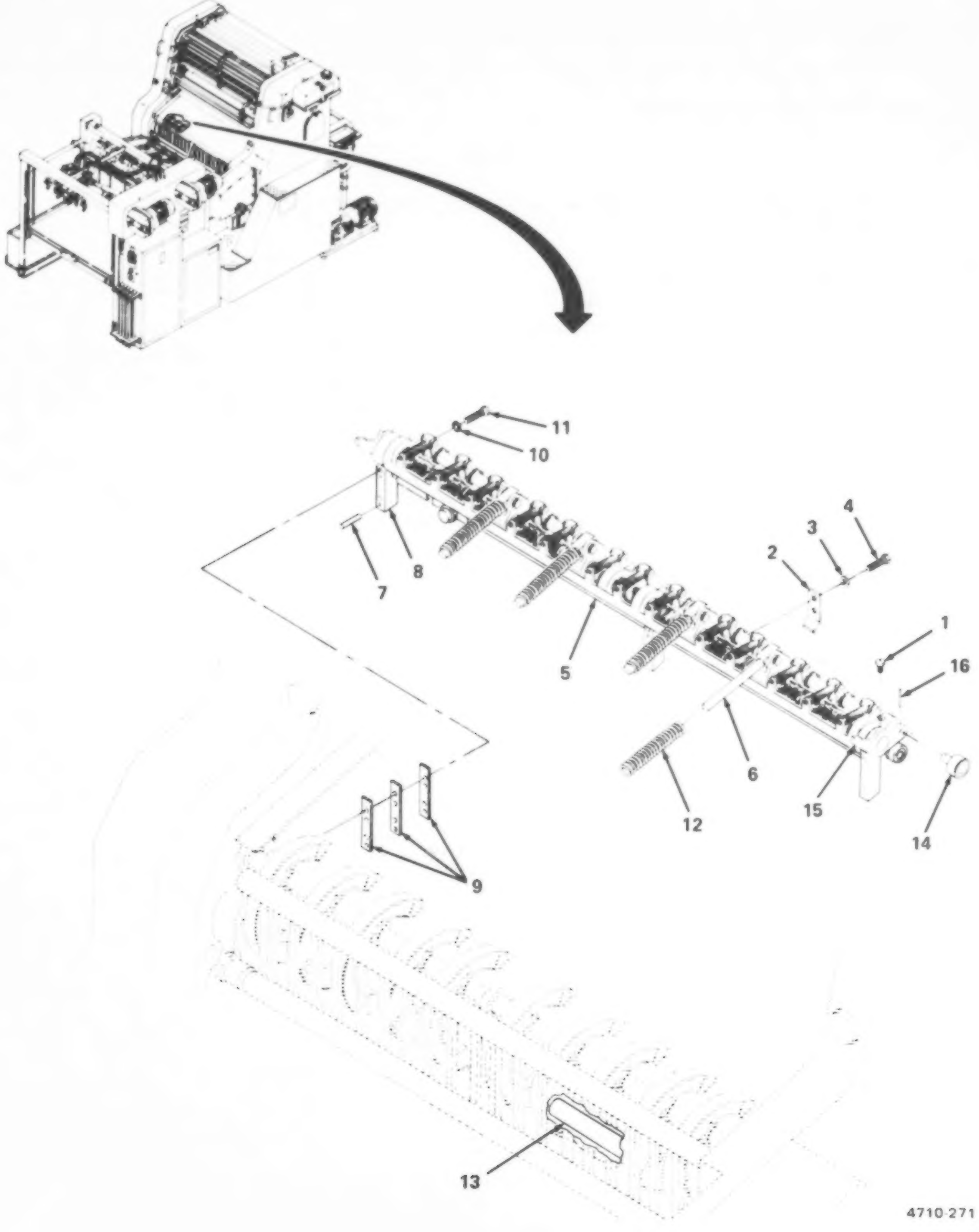
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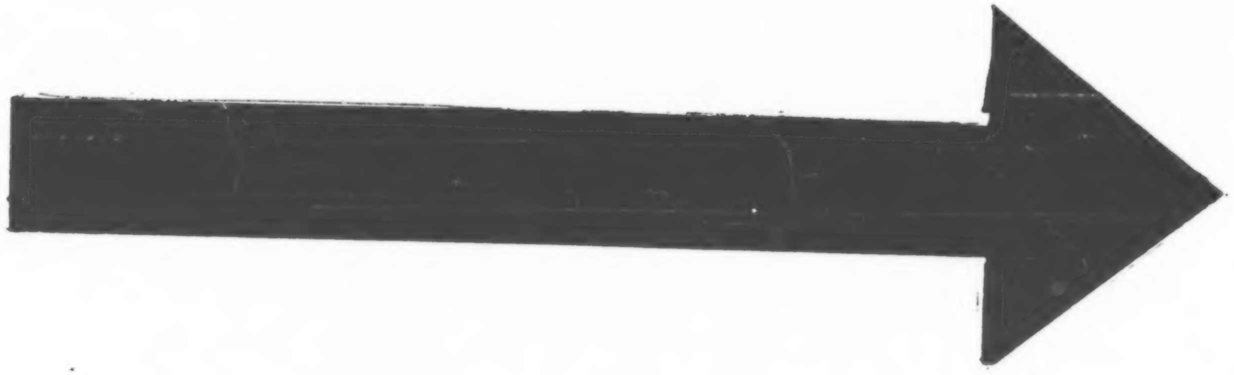
Figure 2-159. Ranger Drum Gripper Bar Assembly.



2-67. Ranger Drum Shaft Assembly (cont).

(c) Drive gears. (figure 2-160)

NOTE

Ranger drum assembly should be rotated until compression springs on gripper bar are up and horizontal.

1 Replace woodruff key (1).

2 Replace flange (2) and aline with key (1).

3 Replace retaining ring (3).

4 Replace tapered locator pins (4) and (5).

5 Replace gear (6) and aline locator hole in gear with locator pin (5).

6 Replace three ribbed washers (7) and socket-head screws (8).

7 Replace gear (9) and aline with locator pin (4).

8 Replace four ribbed washers (10) and socket-head screws (11).

9 **Replace idler gear (12) and retaining ring (13).**

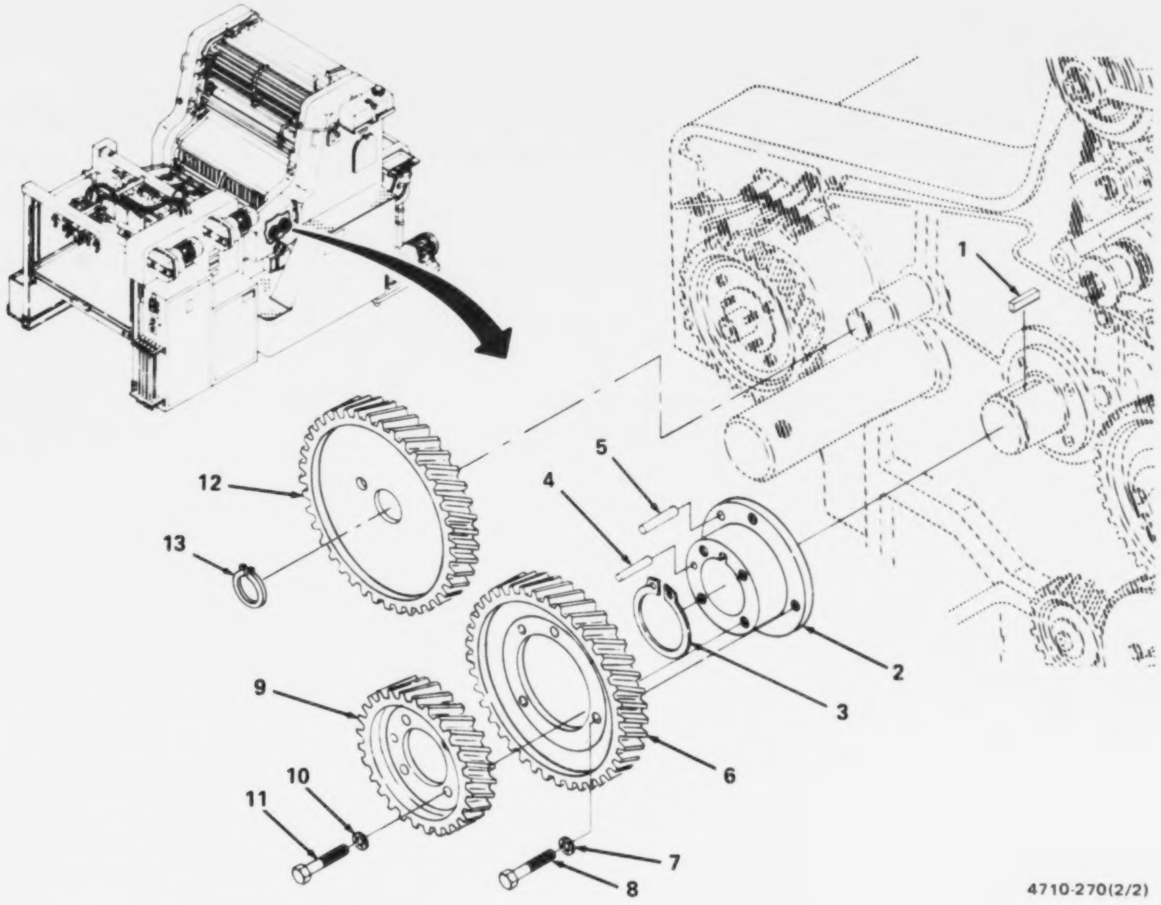

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Figure 2-160. Ranger Drum Drive Gears Assembly.

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2-67. Ranger Drum Shaft Assembly (cont).

b. Adjust.

(1) Install graduated disc and set the press to "0" (para. 2-98).

(2) Engage feeder and rotate press by hand and check that grippers on gripper bar are closing evenly.

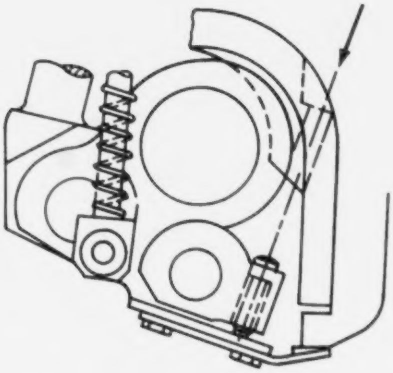
(3) Continue hand turning the press until just before the transfer position from the front lays to the ranger drum is reached. Then inch forward until the gripper bar is in a position where it is exactly 90 degrees to the feed table. Check with a block of wood or mull square. Check that graduated dial reads 85° 30'.

NOTE

Grippers should close at 85 degrees.

(4) Check grippers by inserting onion skin strip. Paper strip should sit firmly and can be pulled out with slight drag. Check each gripper individually.

(5) If required, adjust grippers by inserting cross-tip screwdriver in hole in gripper bar (arrow, figure 2-161) and timing adjusting screw.



4710-214

Figure 2-161. Gripper Bar Adjustment.

NOTE

FOLLOW-ON MAINTENANCE:
(1) Replace register feed guard (para. 2-49).
(2) Replace pull side lay center support (para. 2-49).
(3) Replace cylinder safety guard (para. 2-65).
(4) Replace main guard (D/S) (para. 2-20).

2-68. Electromagnetic Switch.

This task covers:	a. Test	b. Remove	c. Install	d. Adjust

INITIAL SETUP

Tools

Retaining-ring pliers
5 mm hex key
6 mm hex key
8 mm combination wrench
13 mm combination wrench
0.5 x 3.5 x 100 mm flat-tip screwdriver
Combination pliers
Feeler gage

Equipment Conditions

Lower guard and accessories removed (para. 2-19)

Additional Personnel Requirement

Electrician MOS 35E20

a. *Test.* Test switch in accordance with the instructions given in para. 2-10, Troubleshooting.

b. *Remove.* (figure 2-162)

(1) Twist collar on cable (1) to loosen. Tag wires for position identification and disconnect them from magnet (2).

(2) Remove two cap screws (3), two flat washers (4), and two nuts (5).

(3) Pull out cotter pin (6). Remove pin (7), two flat washers (8), and magnet (2).

(4) Remove two cap screws (9), two ribbed washers (10), and fixing plate (11).

(5) Remove stud (12) from stop lever (13). Remove retaining ring (14) and flat washer (15) from stud.

(6) Remove pull rod (16).

(7) Remove stop bolt (17) and shock absorber (18).

(8) Remove cap screw (19), flat washer (20), and guide plate (21).

(9) Remove retaining ring (22) from stud (23). Remove flat washer (24), two needle bushings (25), and stop lever (13).

(10) Remove nut (26), flat washer (27), and stud (23).

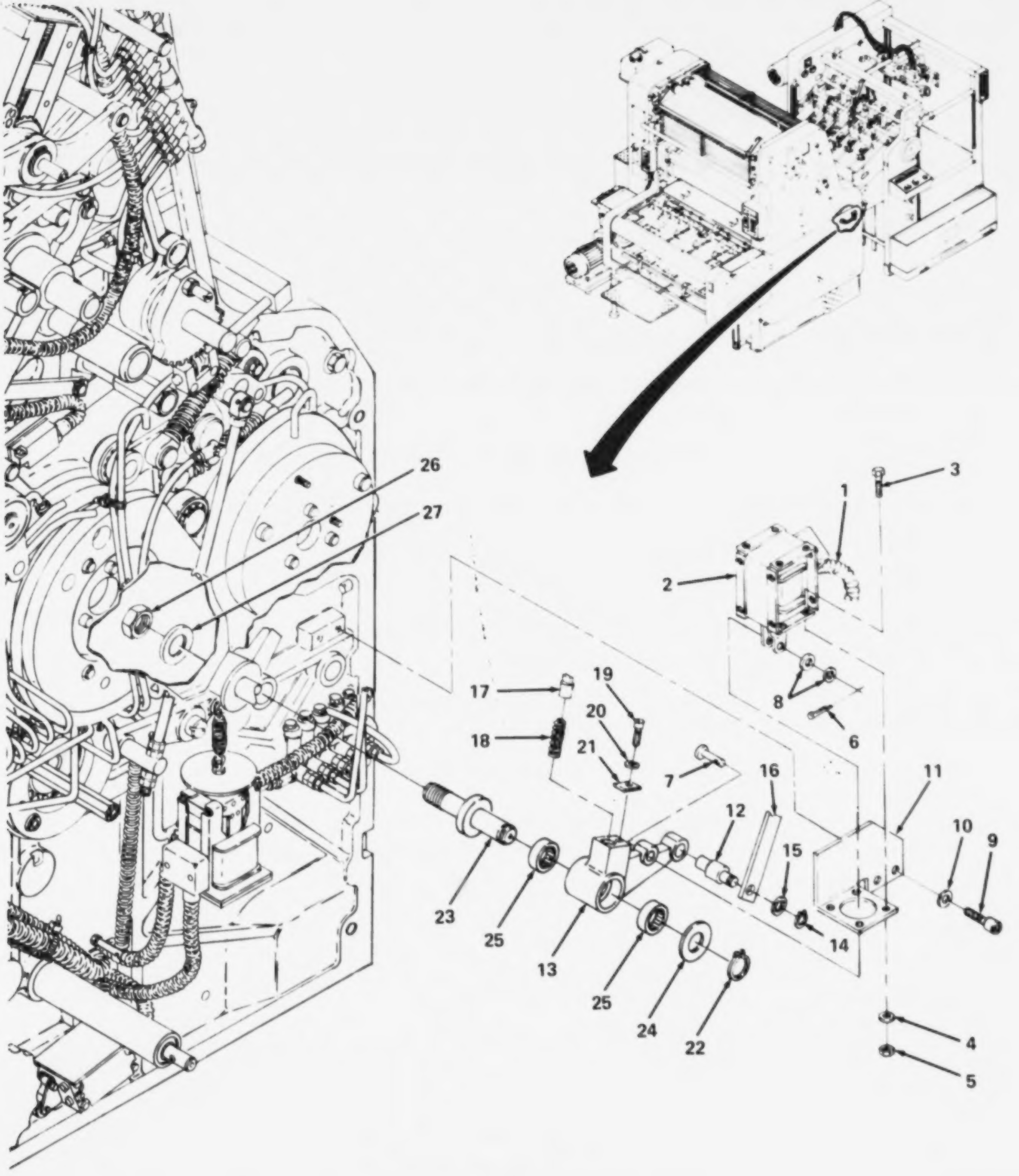

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Figure 2-162. Electromagnetic Switch Removal.

2-68. Electromagnetic Switch (cont).

c. *Install.* (figure 2-163)

(1) Install stud (1) with flat washer (2) and nut (3).

(2) Install stop lever (4), two needle bushings (5), flat washer (6), and retaining ring (7) on stud (1).

(3) Install guide plate (8), flat washer (9), and cap screw (10).

(4) Install shock absorber (11) and stop bolt (12).

(5) Install push rod (13).

(6) Install stud (14) in stop lever (4). Install flat washer (15) and retaining ring (16) on stud (1).

(7) Install fixing plate (17) with two ribbed washers (18) and two cap screws (19).

(8) Install magnet (20), pin (21), and two flat washers (22). Install cotter pin (23) in end of pin.

(9) Install two cap screws (24), two flat washers (25), and two nuts (26).

(10) Connect tagged wires to magnet (20) and remove tags. Engage and twist collar on cable (27).

d. *Adjust.* (figure 2-163). Adjust switch with pull rail assembly using procedure in paragraph 2-50. Refer to figure 2-163 for location of adjustable switch parts.

NOTE

FOLLOW-ON MAINTENANCE
Install lower guard and accessories (para. 2-19).

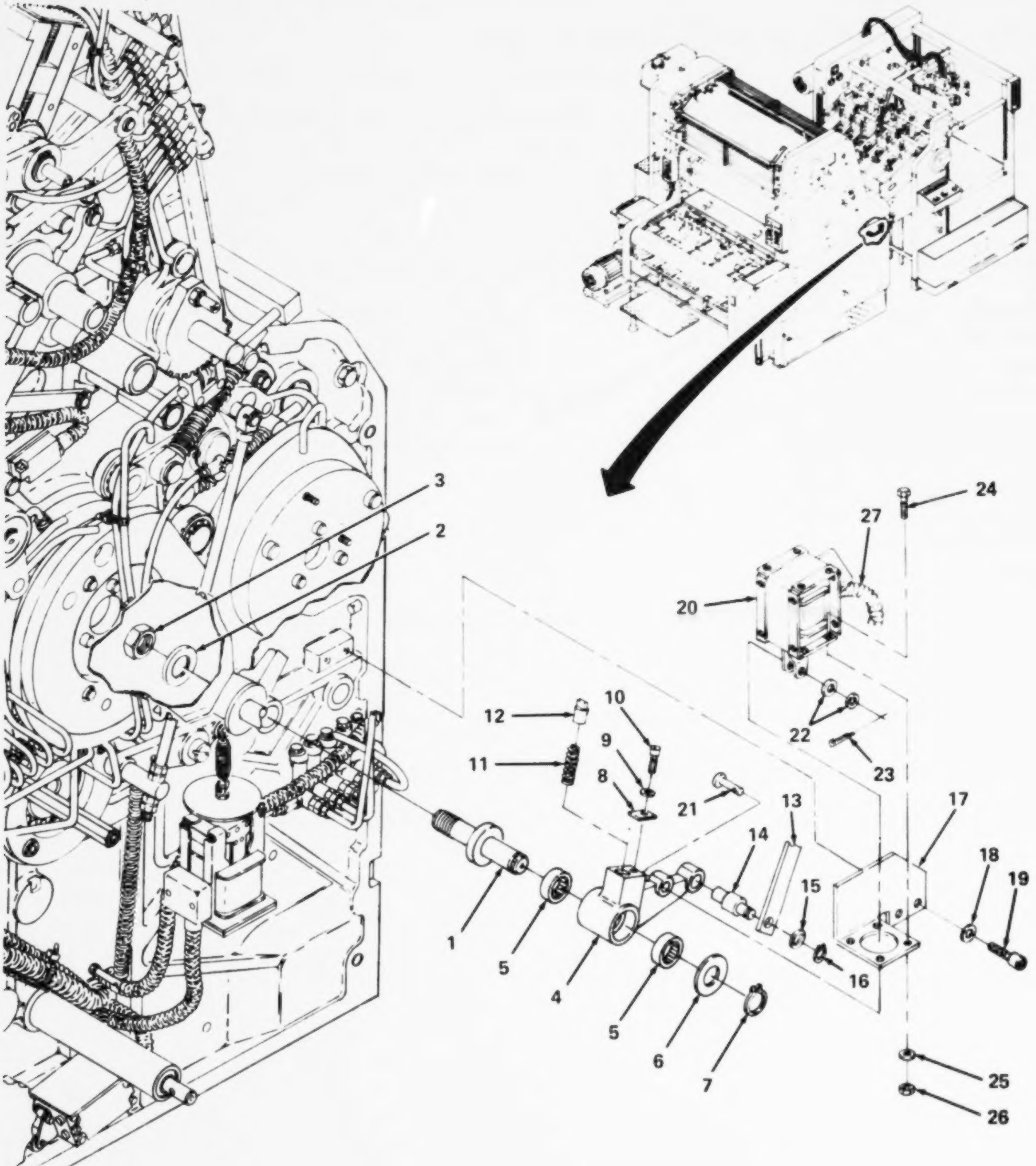
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Figure 2-163. Electromagnetic Switch Installation.

2-69. Impression Cylinder Control Mechanism.

This task covers:	a. Test	c. Disassembly	e. Assembly	g. Adjust
	b. Remove	d. Repair	f. Install	

INITIAL SETUP

Tools

Retaining-ring pliers
Ball-peen hammer
5 mm pin punch
8 mm pin punch
5 mm hex key
10 mm combination wrench
13 mm combination wrench
17 mm combination wrench
19 mm combination wrench
Feeler gage

Equipment Conditions

Main guard (D/S) removed (para. 2-20)
Upper guard (O/S) removed (para. 2-18)
Lower guard (O/S) removed (para. 2-19)
Engaging lever latch assembly removed (para. 2-71)
Ranger drum cams removed (para. 2-67)

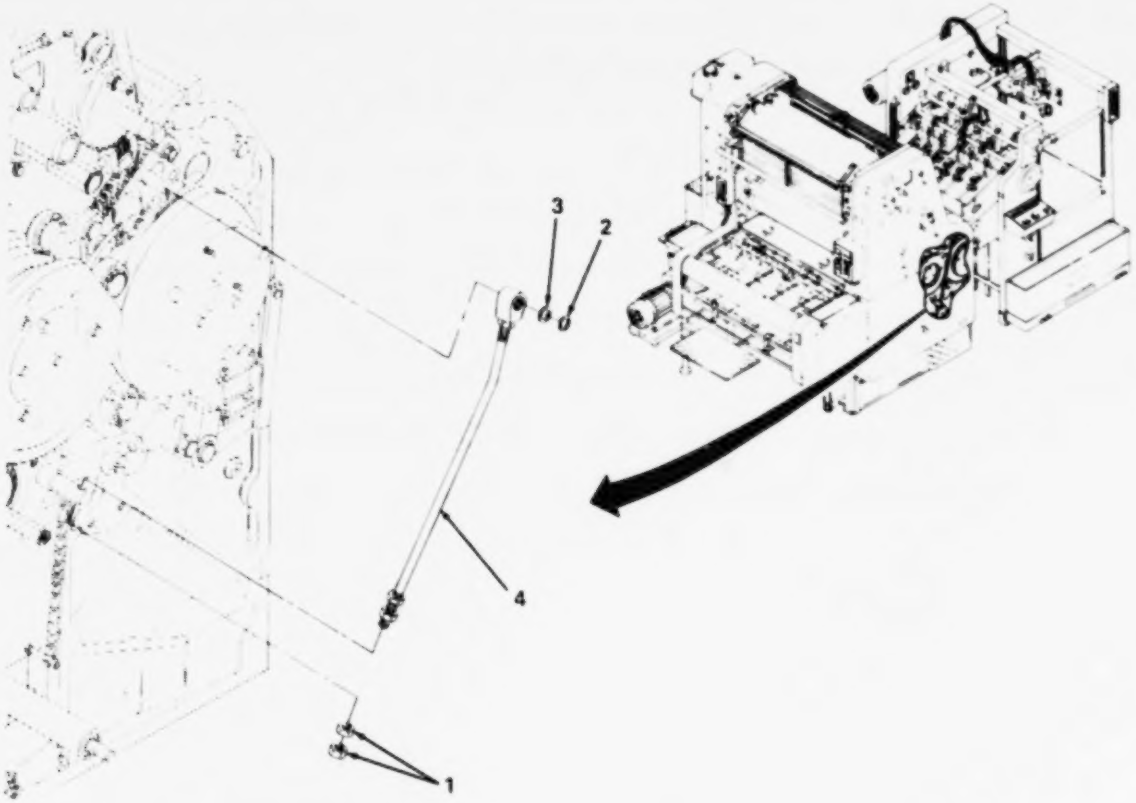
a. Test. Perform test in accordance with the instructions given in para. 2-10, Troubleshooting.

b. Remove.

(1) *Impression cylinder control mechanism removal.*

(a) Remove two hex nuts (1, figure 2-164).

(b) Remove external retaining ring (2), flat washer (3), and operating rod (4).



4710-141(1/4)

Figure 2-164. Operating Rod Removal.

2-69. Impression Cylinder Control Mechanism (cont).

(c) Remove two oil lines (1, figure 2-165).

(d) Remove external retaining ring (2) and flat washer (3).

(e) Remove two screws (4) and two flat washers (5) securing studs (6) to side of press.

(f) Remove retaining ring (7) and washer (8).

(g) Remove stud (6) and impression OFF cam lever (9) and spring rod (10).

(h) Remove tapered pin (11) and slide double cam lever (12) off drive shaft.

(i) Remove stud (6), impression ON cam lever (13), spring rod (14), and shaft (15).

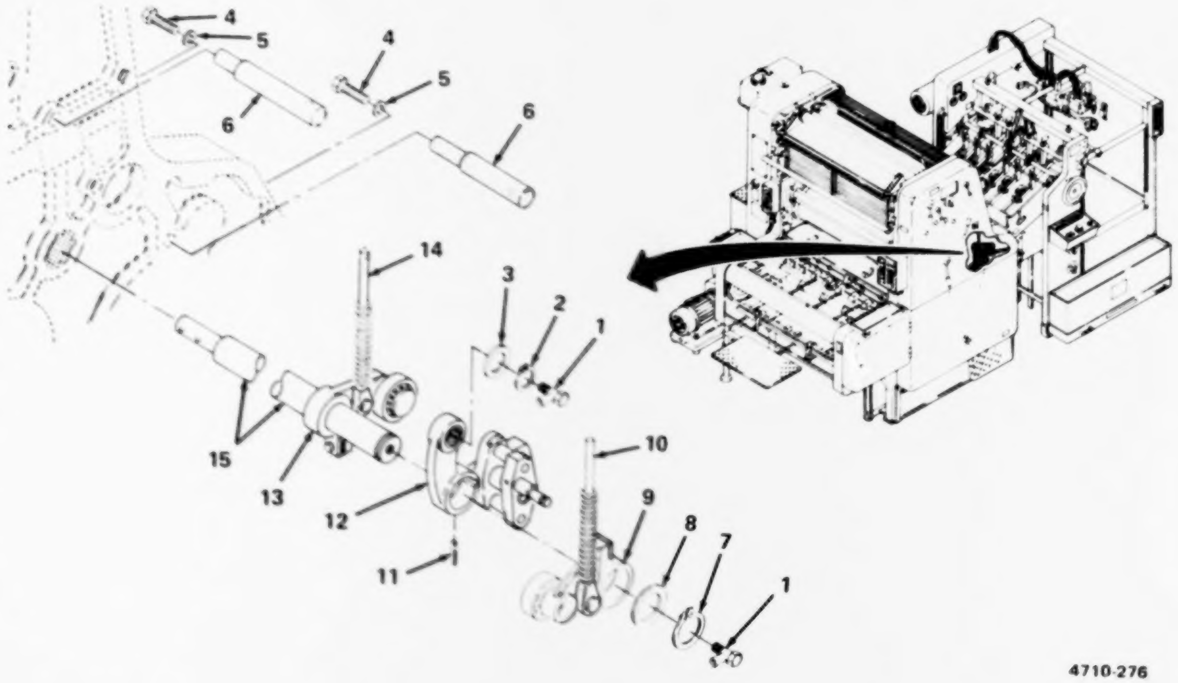


Figure 2-165. Control Shaft Assembly Removal.

(j) Remove four retaining rings (1, figure 2-166), four washers (2), and two pull rods (3).

(k) Remove two hex-head screws (4) from switch mounting bracket (5) and move switch (6) out of the way.

(l) Remove retaining ring (7) and washer (8).

(m) Remove swing lever assembly (9) and pull rod (10) from side of press.

(n) Remove stop (11) from side of press.

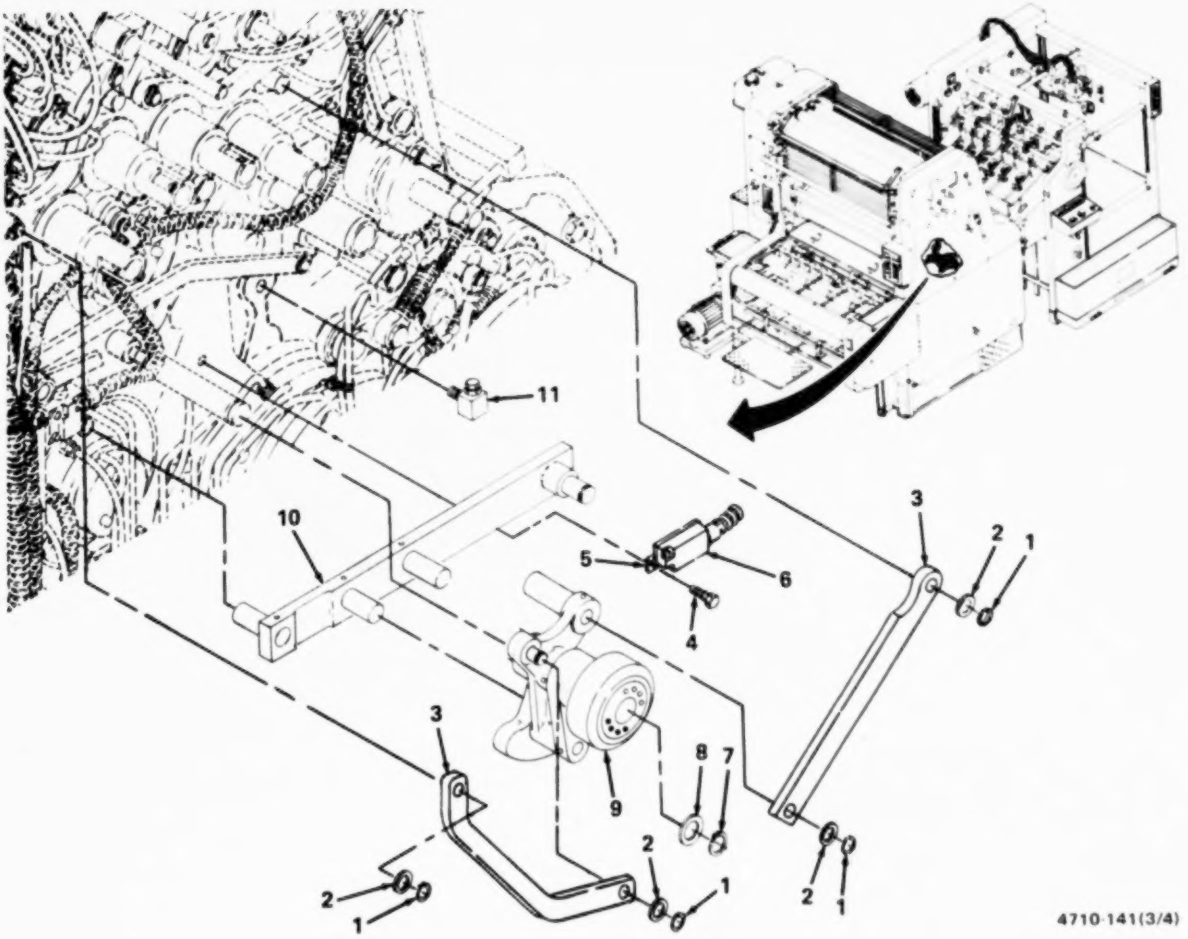


Figure 2-166. Swing Lever Assembly Removal.

2-69. Impression Cylinder Control Mechanism (cont).

(2) *Electromagnetic switch removal.*

(a) Twist cable collar (1, figure 167) clockwise to loosen.

(b) Tag wires to identify position. Loosen screws (2) and remove wiring.

(c) Remove tension spring (3).

(d) Remove two nuts (4), one flat washer (5), and cover plate (6).

(e) Remove two cap screws (7). two flat washers (8), two nuts (9), and electromagnetic switch (10).

(f) Remove two cap screws (11), two flat washers (12), and fixing plate (13).

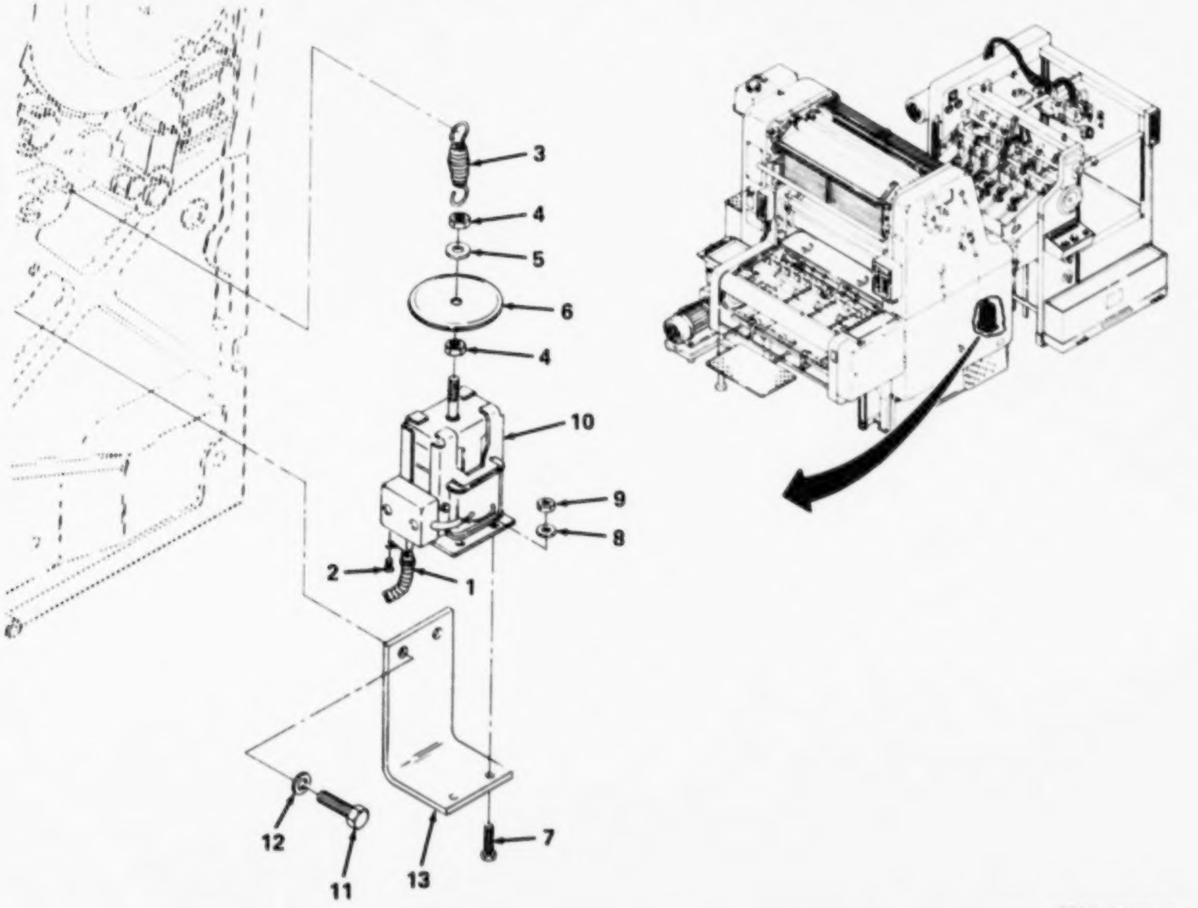


Figure 2-167. Electromagnetic Switch Removal.

c. *Disassembly.*

(1) *Impression OFF cam disassembly.*

(a) Remove pin (1, figure 2-168) and associated spring rod assembly from cam lever (2).

(b) Remove compression spring (3) from spring rod (4).

(c) Remove spring tension pin (5) from rod head (6) and remove rod head from spring rod (4).

(d) Remove needle bushing (7) from rod head (6).

(e) Remove tapered pin (8), rolelr shaft (9), and ball bearing (10) from cam lever (2).

(f) Remove socket-head screw (11), plate (12), and shims (13) from cam lever.

(g) Remove needle bushing (14) from cam lever (2).

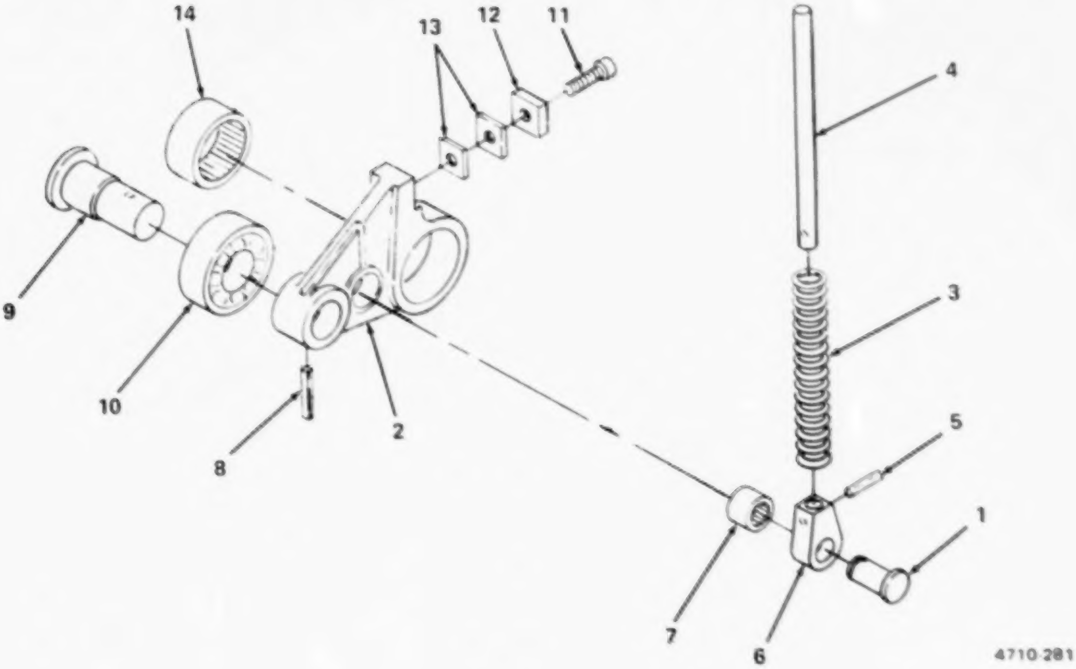


Figure 2-168. Impression OFF Cam Disassembly.

2-69. Impression Cylinder Control Mechanism (cont).

(2) *Double cam disassembly.*

(a) Remove screw (1, figure 2-169), flat washer (2), spacer (3), and bolt (4) from double lever (5).

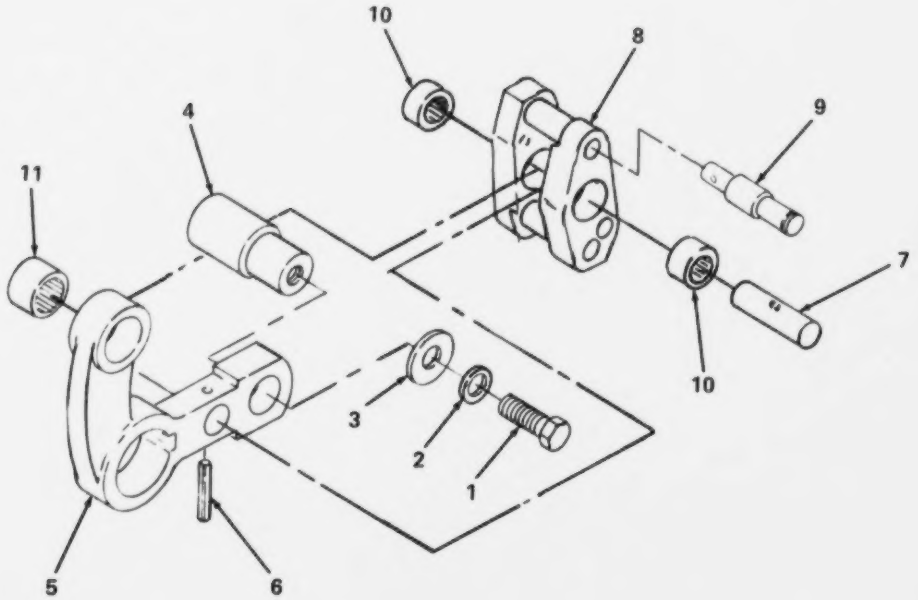
(b) Remove spring tension pin (6) from double lever (5).

(c) Remove pivot shaft (7) and ratchet pawl (8) from double lever (5).

(d) Remove pin (9) from ratchet pawl (8).

(e) Remove two needle bushings (10) from ratchet pawl (8).

(f) Remove needle bushing (11) from double lever (5).



4710-278

Figure 2-169. Double Cam Disassembly.

(3) *Impression ON cam disassembly.*

(a) Remove key (1, figure 2-170) and slide roller lever (2) off drive shaft (3).

(b) Remove pin (4) and associated spring rod assembly from roller lever (2).

(c) Remove compression spring (5) from spring rod (6).

(d) Remove spring tension pin (7) from rod head (8) and remove rod head from spring rod (6).

(e) Remove needle bushing (9) from rod head (8).

(f) Remove spring tension pin (10), roller shaft (11), and ball bearing (12) from roller lever (2).

(g) Remove socket-head screw (13), plate (14), and shims (15) from roller lever (2).

(h) Remove needle bushing (16) from roller lever.

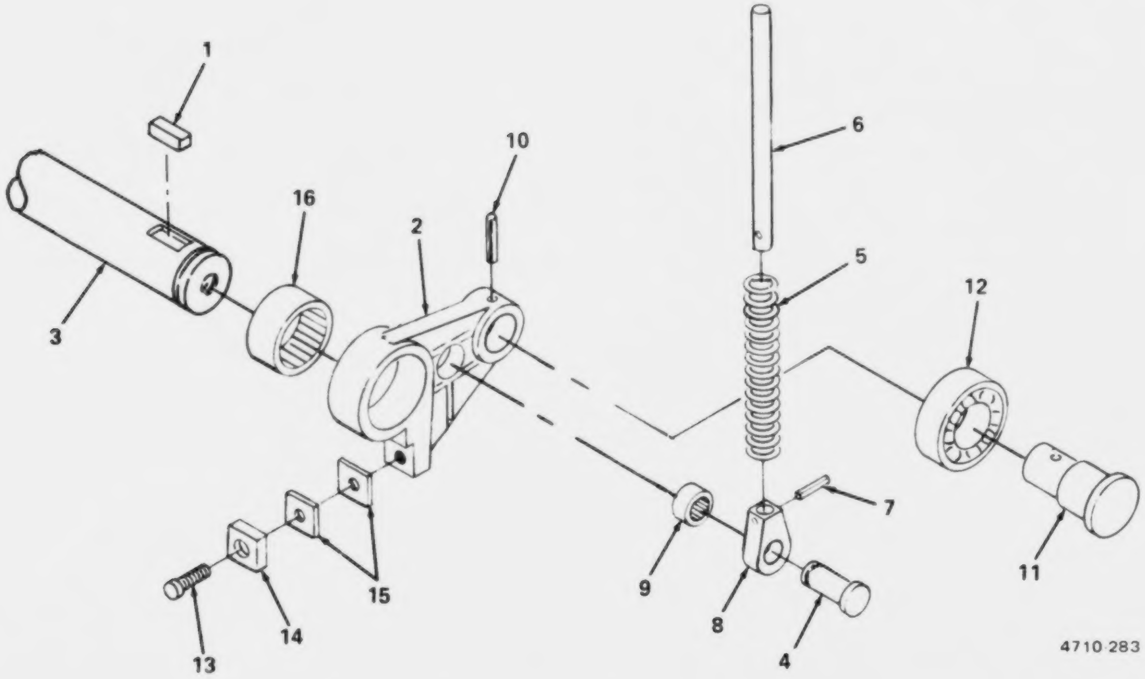


Figure 2-170. Impression ON Cam Disassembly.

2-69. Impression Cylinder Control Mechanism (cont).

(4) *Swing lever disassembly.*

(a) Remove spring tension pin (1, figure 2-171) and separate hand rod support bolt (2) from stud (3).

(b) Remove spring tension pin (4) from slide control lever (5).

(c) Remove stud (3) and compression spring (6) from control lever (5) and swing lever (7).

(d) Remove shouldered stud (8) from control lever (5).

(e) Remove spring tension pin (9) and stop bolt (10) from control lever.

(f) Remove three spring tension pins (11) from pull rod (12) and remove three pins (13).

(g) Remove screw (14) and nut (15) from stop (16).

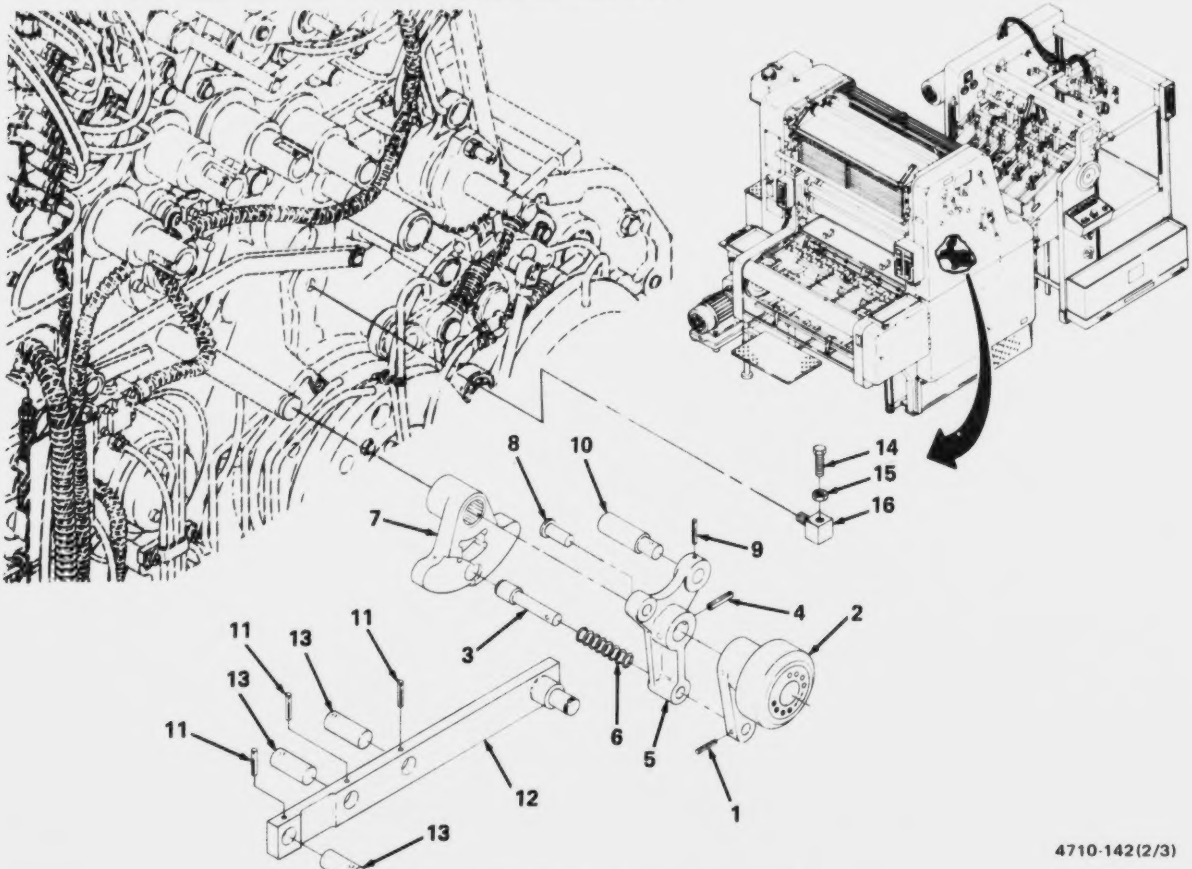
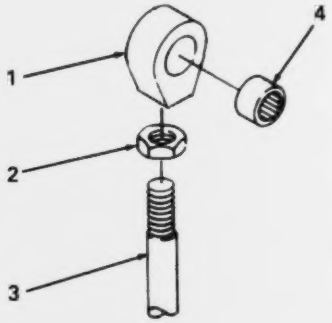


Figure 2-171. Swing Lever Disassembly.

(5) *Operating rod disassembly.*

(*a*) Remove rod head (1, figure 2-172) and nut (2) from operating rod (3).

(*b*) Remove needle busing (4) from rod head (1).



4710-142(3/3)

Figure 2-172. Operating Rod Disassembly.

d. *Repair.*

(1) Replace worn or damaged needle bushings.

(2) Replace frozen or binding ball bearings.

(3) Replace weak or broken compression springs.

(4) Replace worn or damaged pins and rollers.

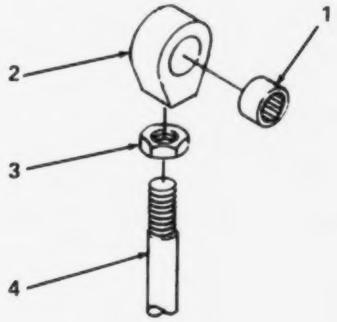
2-69. Impression Cylinder Control Mechanism (cont).

e. *Assembly.*

(1) *Operating rod assembly.* (figure 2-173)

(a) Replace needle bushing (1) in rod head (2).

(b) Replace nut (3) and rod head (2) on operating rod (4).



4710-275(3/3)

Figure 2-173. Operating Rod Assembly.

(2) *Swing lever assembly.*

(a) Replace screw (1, figure 2-174) and nut (2) on stop (3).

(b) Replace three straight pins (4) in pull rod (5) and replace three spring tension pins (6).

(c) Replace stop bolt (7) in control lever (8) and replace spring tension pin (9).

(d) Replace shouldered stud (10) in control lever (8).

(e) Replace stud (11) and compression spring (12) in control lever (8) and swing lever (13).

(f) Replace spring tension pin (14) in control lever (8).

(g) Replace spring tension pin (15) in handle rod support bolt (16).

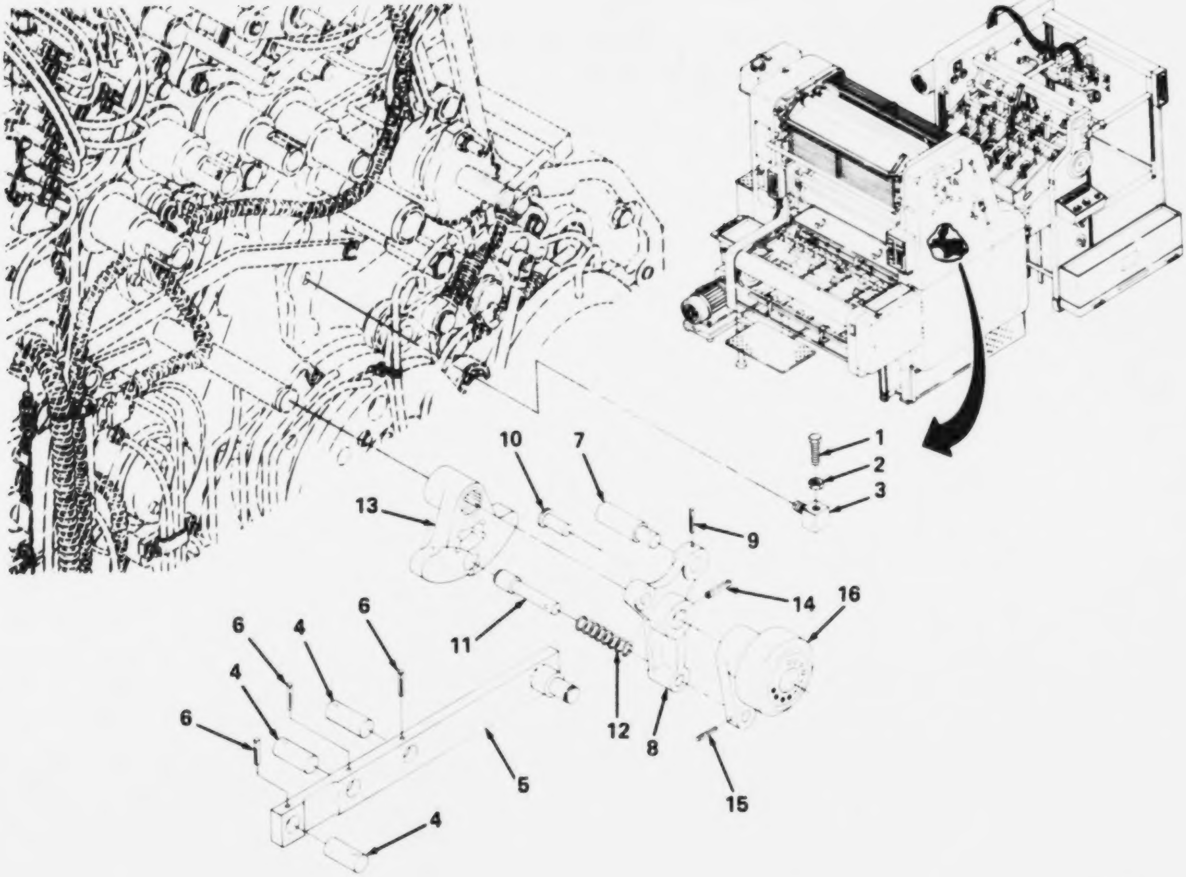

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Figure 2-174. Swing Lever Assembly.

2-69. Impression Cylinder Control Mechanism (cont).

(3) *Impression ON cam assembly.*

(a) Replace needle bushing (1, figure 2-175) in roller lever (2).

(b) Position shims (3) and plate (4) on roller lever (2) and replace socket-head screw (5).

(c) Replace roller shaft (6) and ball bearing (7) on roller lever (2) and replace spring tension pin (8).

(d) Replace needle bushing (9) in rod head (10).

(e) Replace rod head (10) on spring rod (11) and replace spring tension pin (12).

(f) Replace compression spring (13) on spring rod (11).

(g) Position spring rod assembly on roller lever (2) and replace pin (14).

(h) Slide roller lever (2) on drive shaft (15) and assemble key (16) in shaft.

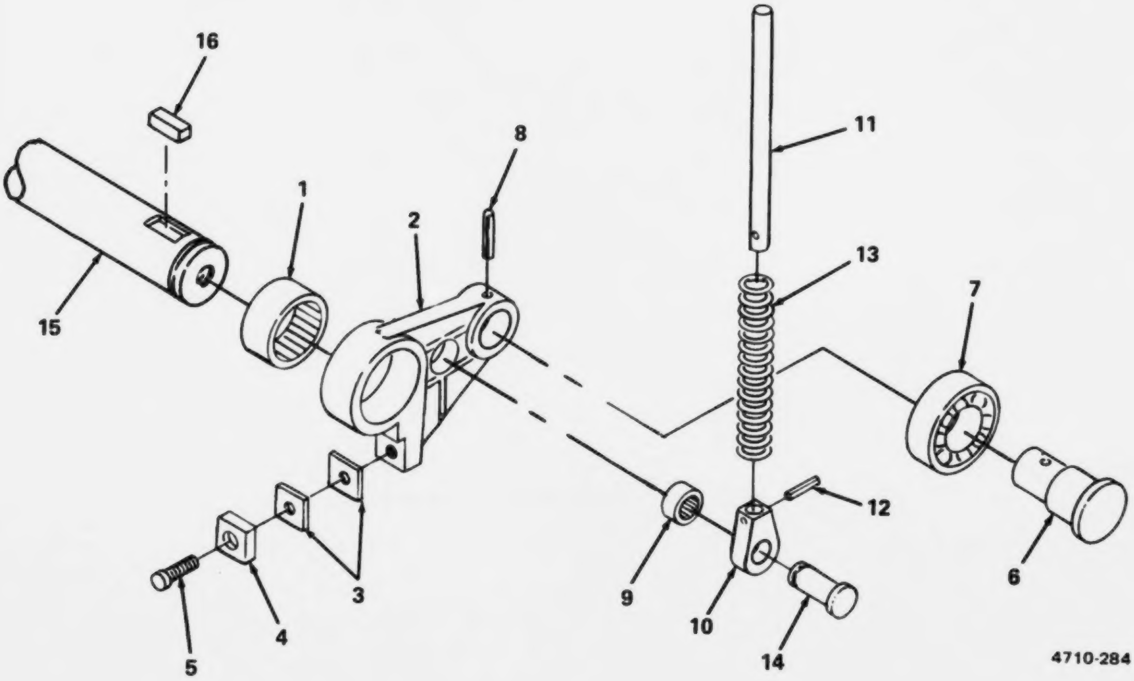

Figure 2-175. Impression ON Cam Assembly.

(4) *Double cam assembly.* (figure 2-176)

(a) Replace needle bushing (1) in double lever (2).

(b) Replace two needle bushings (3) in ratchet pawl (4).

(c) Replace pin (5) in ratchet pawl (4).

(d) Position ratchet pawl (4) on double lever (2) and replace pivot shaft (6).

(e) Replace spring tension pin (7) in double lever (2).

(f) Position bolt (8) in double lever (2) and replace screw (9), flat washer (10), and spacer (11).

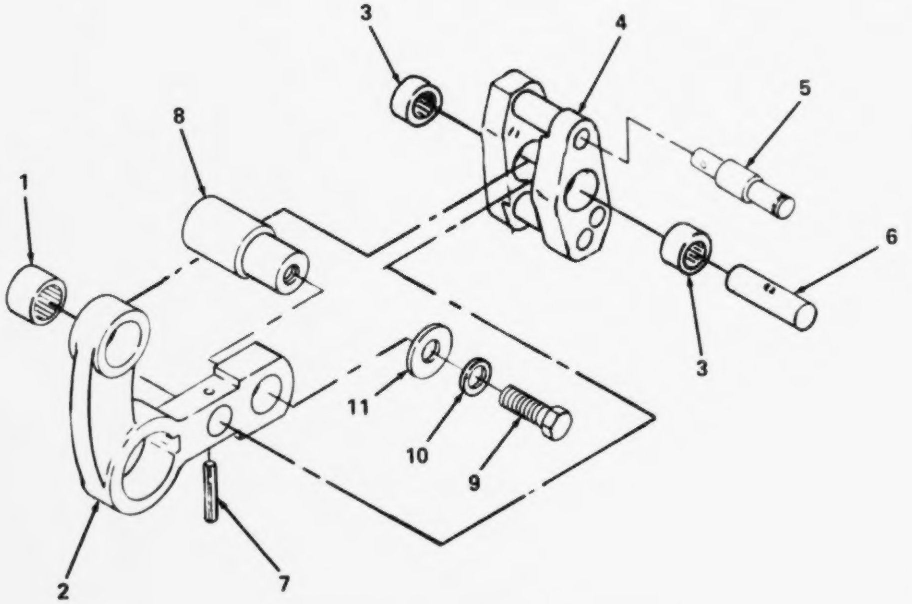

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Figure 2-176. Double Cam Assembly.

2-69. Impression Cylinder Control Mechanism (cont).

(5) *Impression OFF cam assembly.* (figure 2-177)

(a) Replace needle bushing (1) in cam lever (2).

(b) Position shims (3) and plate (4) on cam lever (2) and replace socket-head screw (5).

(c) Replace roller shaft (6) and ball bearing (7) on cam lever (2), and replace tapered pin (8).

(d) Replace needle bushing (9) in rod head (10).

(e) Replace rod head (10) on spring rod (11) and replace spring tension pin (12).

(f) Replace compression spring (13) on spring rod (11).

(g) Position spring rod assembly on cam lever (2) and replace pin (14).

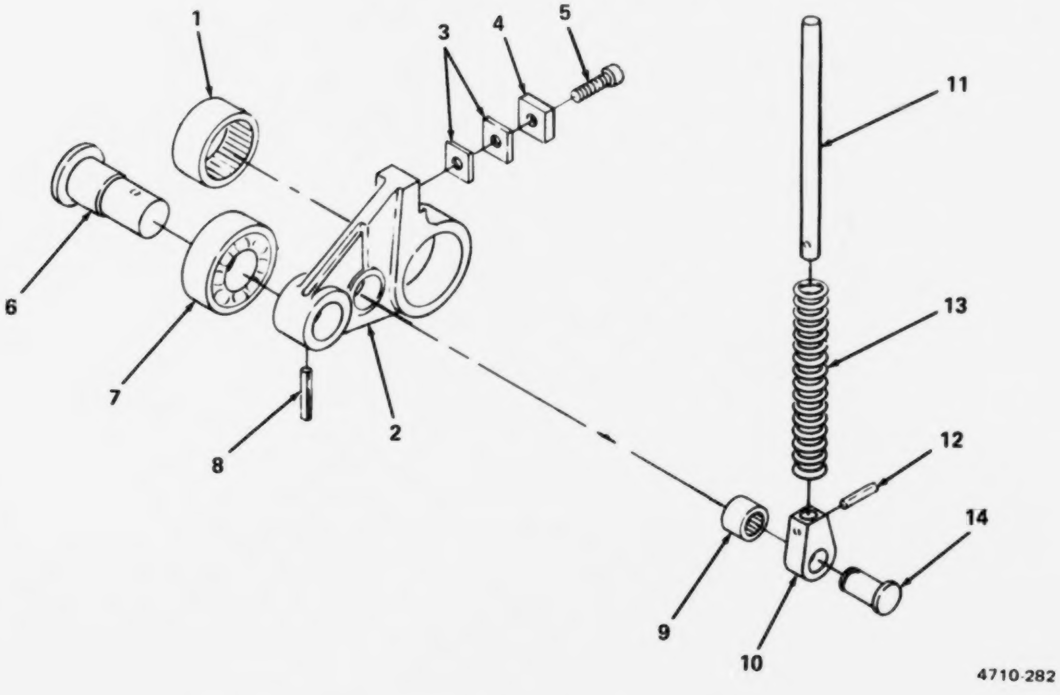


Figure 2-177. Impression OFF Cam Assembly.

f. ***Install.***

(1) *Electromagnetic switch.* (figure 2-178)

(a) Install fixing plate (1), two cap screws (2), and two flat washers (3).

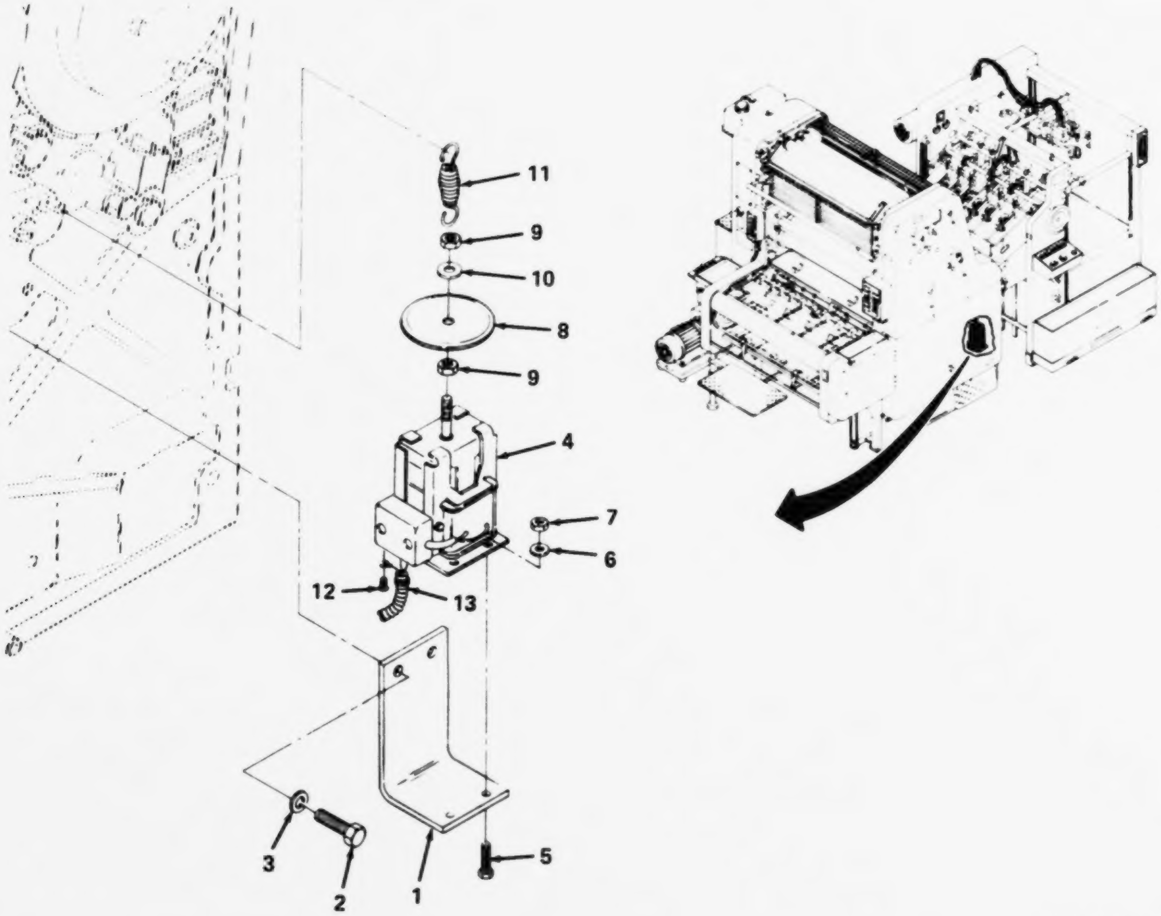
(b) Install switch (4), two cap screws (5), two flat washers (6), and two nuts (7).

(c) Install cover plate (8), two nuts (9), and one flat washer (10).

(d) Install tension spring (11).

(e) Install wiring and tighten screws (12).

(f) Twist cable collar (13) counterclockwise to secure wires.



4710-273(4/4)

Figure 2-178. Electromagnetic Switch Installation.

2-69. Impression Cylinder Control Mechanism (cont).

(2) *Impression cylinder control mechanism.*

(a) Replace stop (1, figure 2-179) in side of press.

(b) Position pull rod (2) in swing lever assembly and install swing lever assembly (3) on bearing bolt in side of press.

(c) Install washer (4) and retaining ring (5).

(d) Position switch (6) and switch bracket (7) on press and install two hex-head screws (8).

(e) Install two pull rods (9), four flat washers (10), and four retaining rings (11).

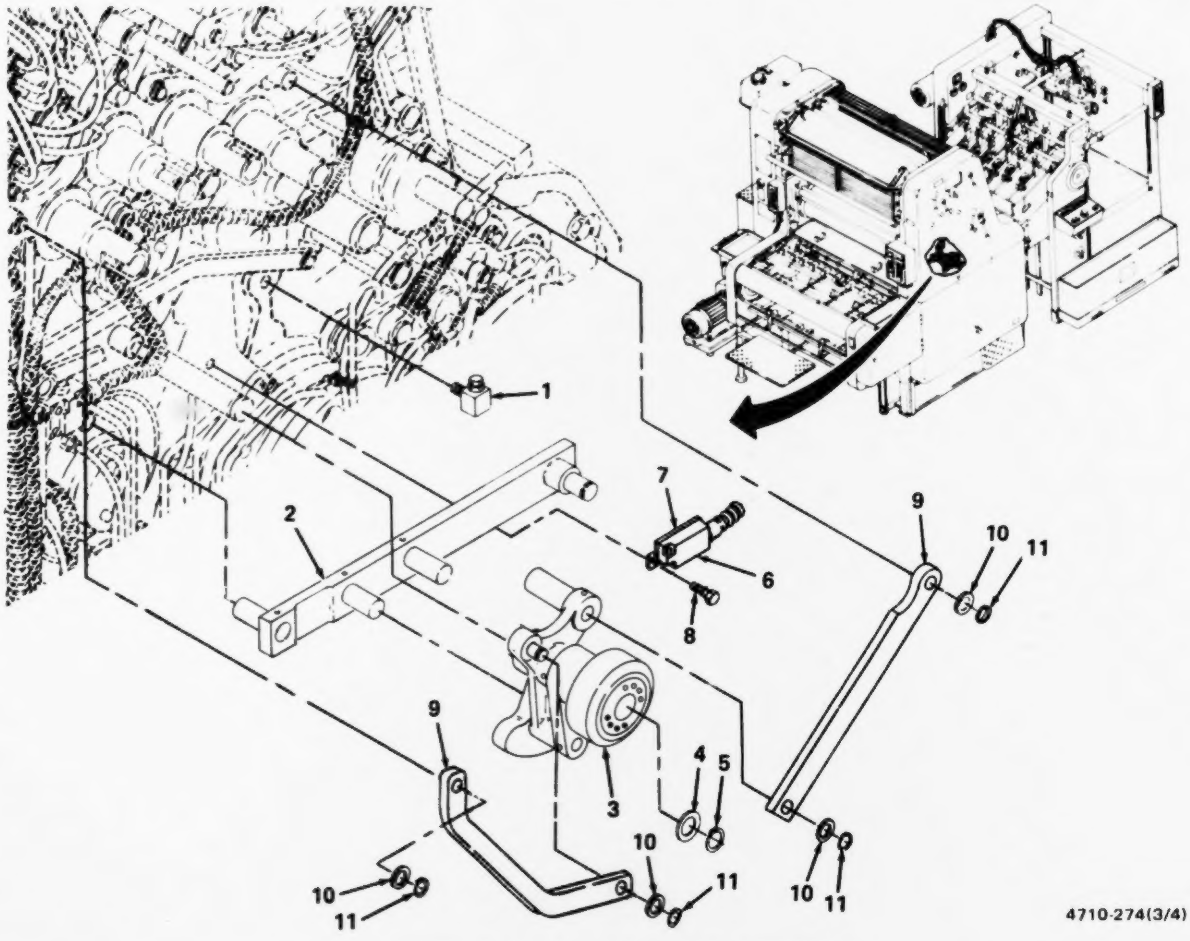


Figure 2-179. Swing Lever Assembly Installation.

(f) Install stud (1, figure 2-180), impression ON cam lever (2), spring rod (3), and shaft (4) in press.

(g) Install double lever (5) on drive shaft (4) and install tapered pin (6).

(h) Install stud (7), impression OFF cam lever (8), and spring rod (9).

(i) Install washer (10) and retaining ring (11).

(j) Install two screws (12) and two flat washers (13) securing studs (1) and (7) to side of press.

(k) Install flat washer (14) and external retaining ring (15).

(l) Install two oil lines (16).

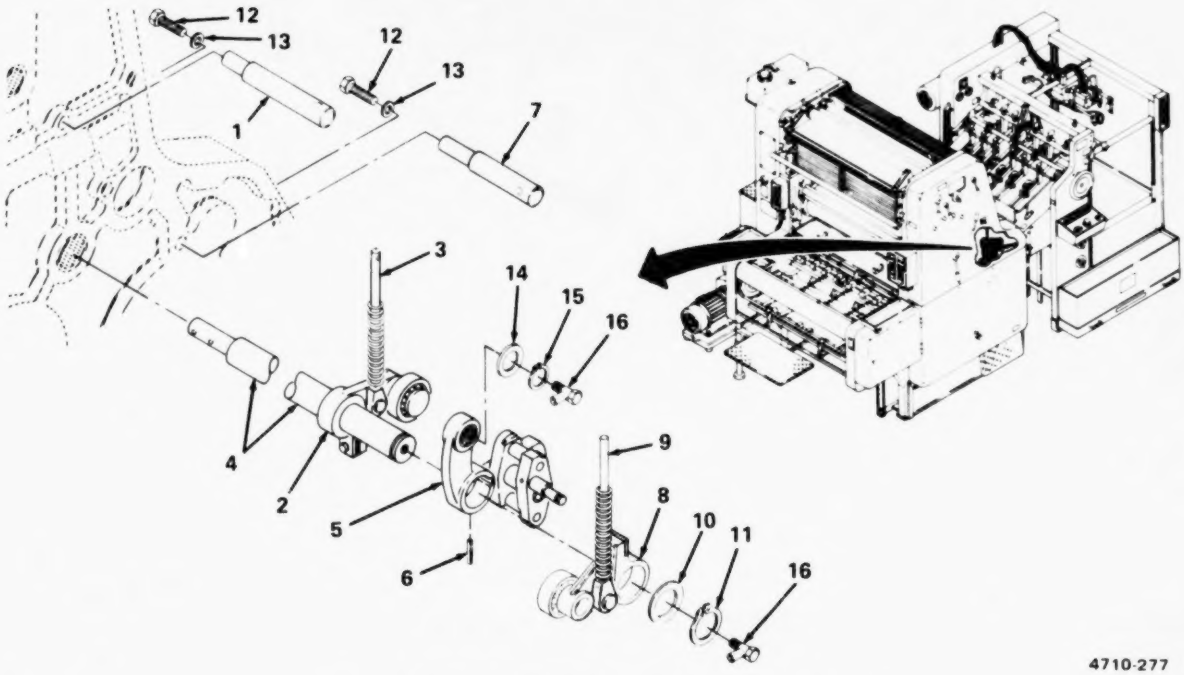


Figure 2-180. Control Shaft Assembly Installation.

2-69. Impression Cylinder Control Mechanism (cont).

(3) *Operating rod.*

(a) Install operating rod (1, figure 2-181), flat washer (2), and retaining ring (3).

(b) Install two hex nuts (4).

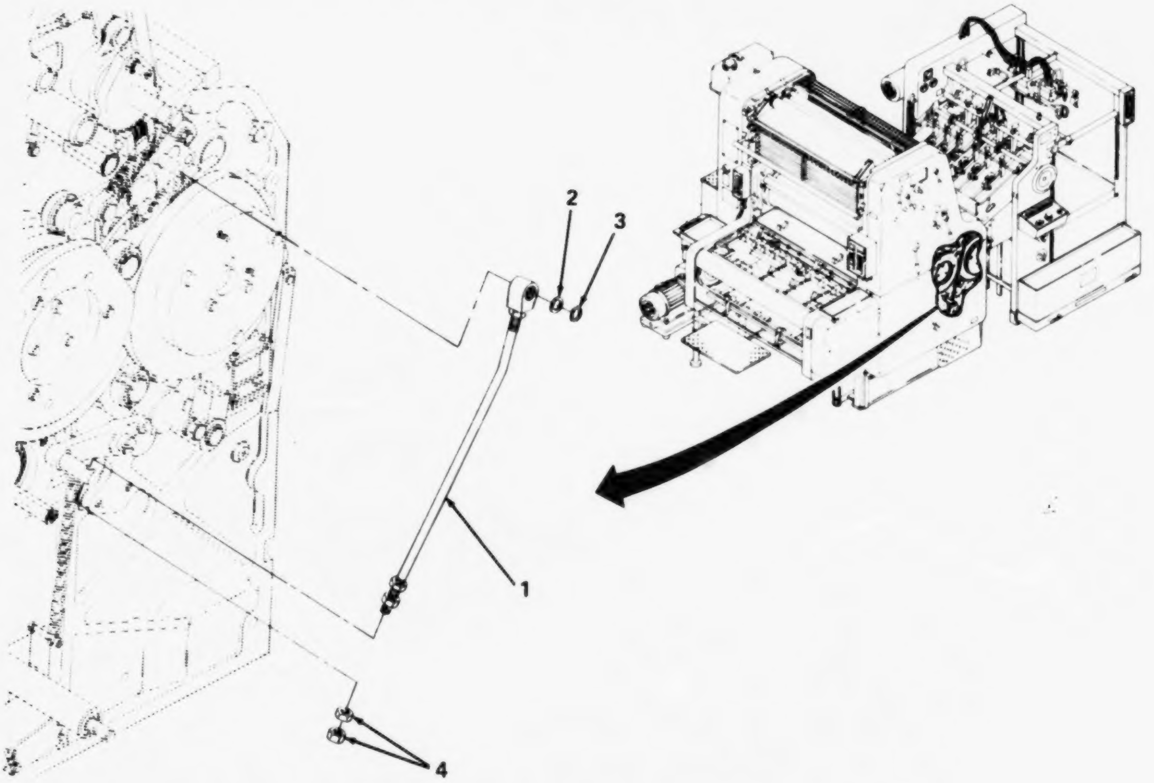


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Figure 2-181. Operating Rod Installation.

g. Adjust.

(1) *Adjustment, impression ON, manual.* (figure 2-182)

(a) Using manual lever, put press in impression ON.

(b) Inch press forward until roller (1) comes to a stop at the highest point of cam (2).

(c) Check that bolt (3) contacts the upper run of the recess (4) in the side frame.

NOTE

If bolt does not contact upper run of recess, adjust engaging lever (D/S) (para. 2-36).

(d) Measure distance between pawl (5) and plate (6). Adjust to between 0.15 to 0.20 mm, using shims if required.

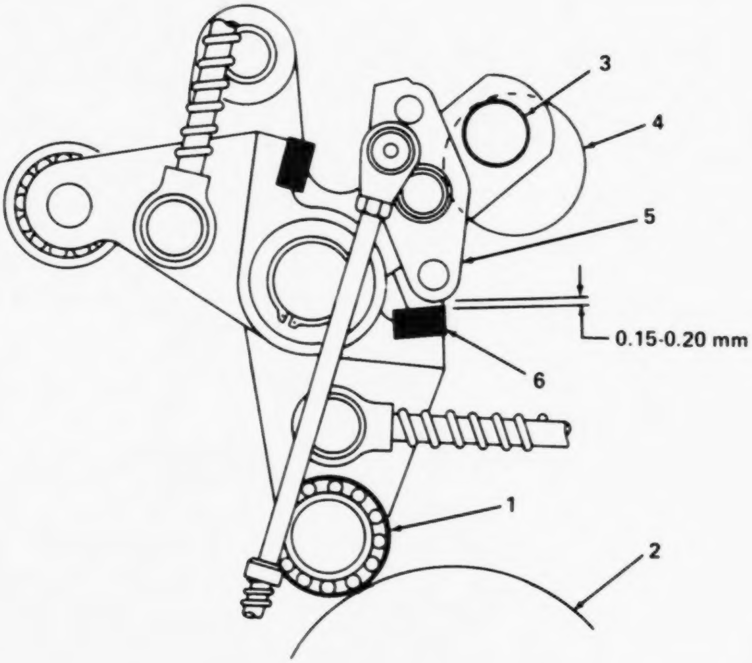

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Figure 2-182. Impression ON Adjustment.

2-69. Impression Cylinder Control Mechanism (cont).

(2) *Adjustment, impression OFF, manual.* (figure 183)

(a) Using manual lever, put press in Impression OFF.

(b) Inch press forward until roller (1) comes to a stop at the highest point of cam (2).

(c) Check that bolt (3) contacts the lower run of the recess (4) in side frame.

NOTE

If bolt does not contact lower run of recess, adjust engaging lever (D/S) (para. 2-36.).

(d) Measure the distance between pawl (5) and plate (6). Adjust to between 0.15 mm and 0.20 mm using shims if required.

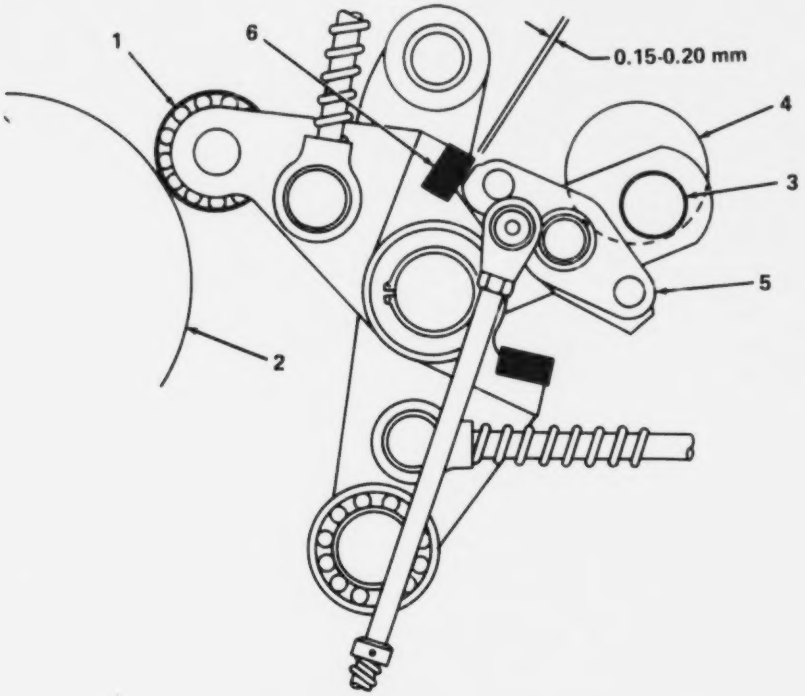


Figure 2-183. Impression OFF Adjustment.

(3) *Electromagnetic switch alinement.* (figure 2-184)

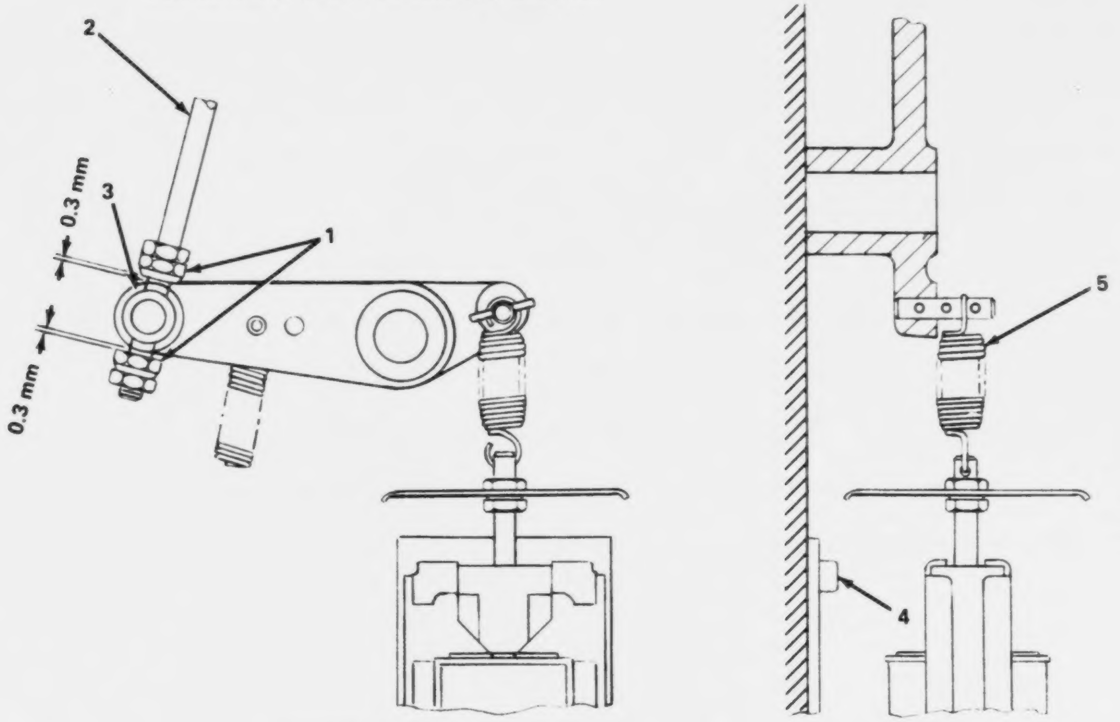
(a) With main power switch ON, press Impression ON pushbutton.

WARNING

When working on high-voltage components, always have an additional person present, and keep one hand away from equipment to reduce hazard of current flowing through vital organs of body. Remove all jewelry from fingers, wrist, and neck prior to working on electrical components. Failure to do so may result in death or serious burns.

(b) Adjust two upper and lower locking nuts (1) on connecting rod (2) so as to leave 0.3 mm clearance above and below bolt (3).

(c) If necessary, loosen electromagnetic switch mounting (4) and position up or down until bolt spring (5) pulls up absolutely straight.



FRONT VIEW

SIDE VIEW

Figure 2-184. Impression ON Electromagnetic Spring Tension Adjustment.

NOTE

FOLLOW-ON MAINTENANCE:
(1) Install ranger drum cams (para. 2-67).
(2) Install lever latch assembly (para. 2-71).
(3) Install lower guard (O/S) (para. 2-19).
(4) Install upper guard (O/S) (para. 2-18).
(5) Install main guard (D/S) (para. 2-20).

2-70. Impression Cylinder Assembly.

This task covers: a. Remove b. Inspect c. Repair d. Install e. Adjust

INITIAL SETUP

Tools

Stud remover collet
Stud remover housing
6 mm combination wrench
17 mm combination wrench
Dial gage

Equipment Conditions

Cylinder safety guard removed (para. 2-65)
Blanket cylinder drive gear removed (para. 2-75)

a. *Remove.*

(1) Impression cylinder. (figure 2-185)

NOTE

Put press in "0" position with impression ON (TM 5-3610-286-10).

(a) Remove two cap screws (1) and gripper (2).

(b) Remove three socket-head screws (3), three washers (4) and cam (5).

(c) Remove two tapered pins (6), six cap screws (7), six washers (8), and gear (9).

(d) Remove grease fittings (10).

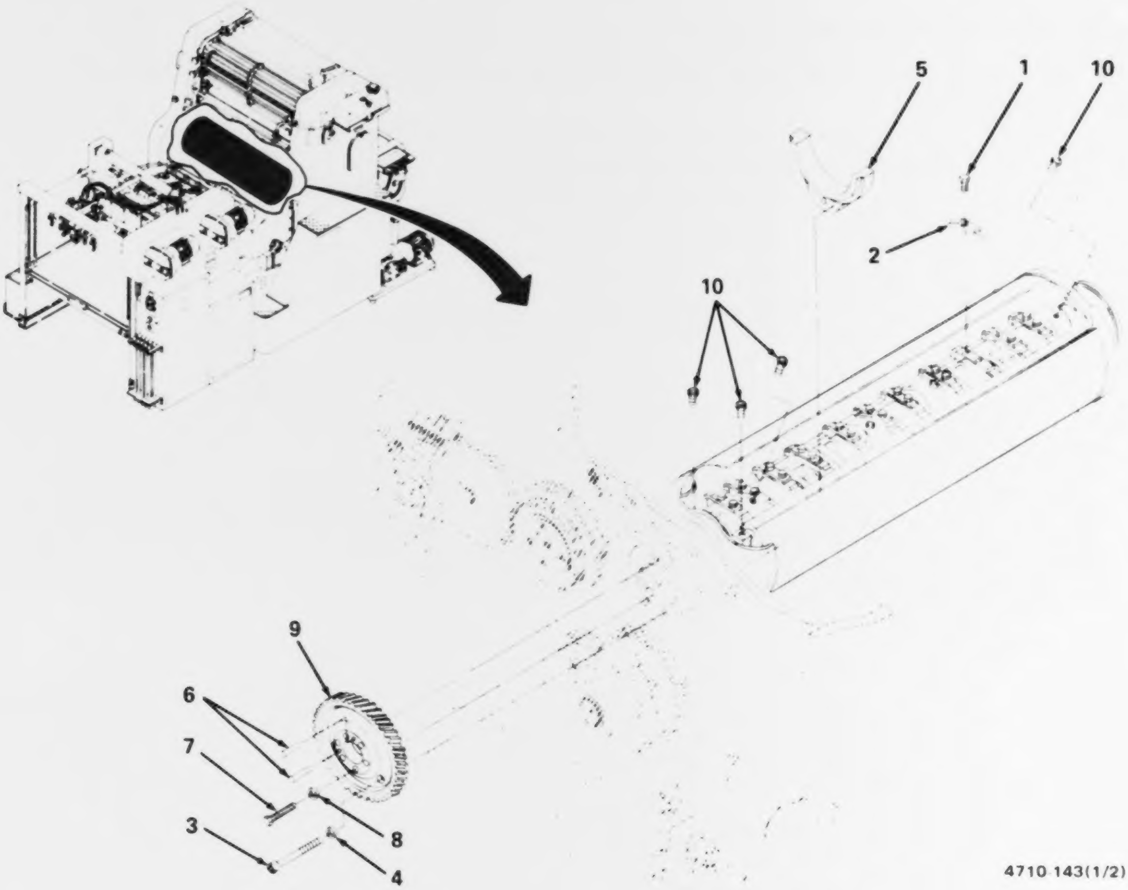

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Figure 2-185. Impression Cylinder Removal.

2-70. Impression Cylinder Assembly (cont).

(2) *Sheet guides.* (figure 2-186)

(a) Unscrew four socket-head screws (1) and pull out support bar (2) with sheet guides (3) attached.

(b) Remove spring pins (4) and sheet guides (3).

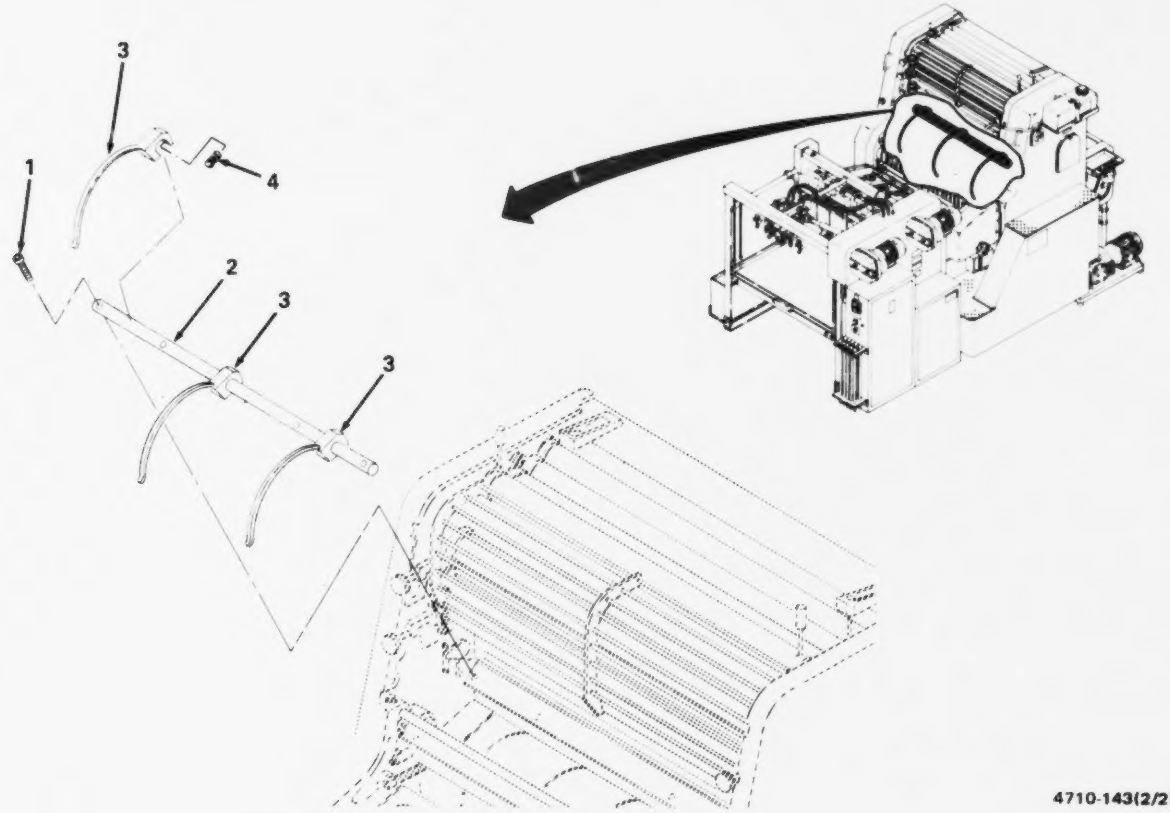

Figure 2-186. Impression Cylinder Sheet Guide Removal.

b. *Inspect.* To inspect for wear, check gears for backlash using a dial gage. Nominal backlash for the impression cylinder is between 0.03 mm and 0.05 mm.

c. *Repair.* Replace worn or damaged components.

d. *Install.*

(1) *Sheet guides.* (figure 2-187)

(a) Position sheet guides (1) on support bar (2) and install spring pins (3).

(b) Install support bar (2) with four socket-head screws (4).

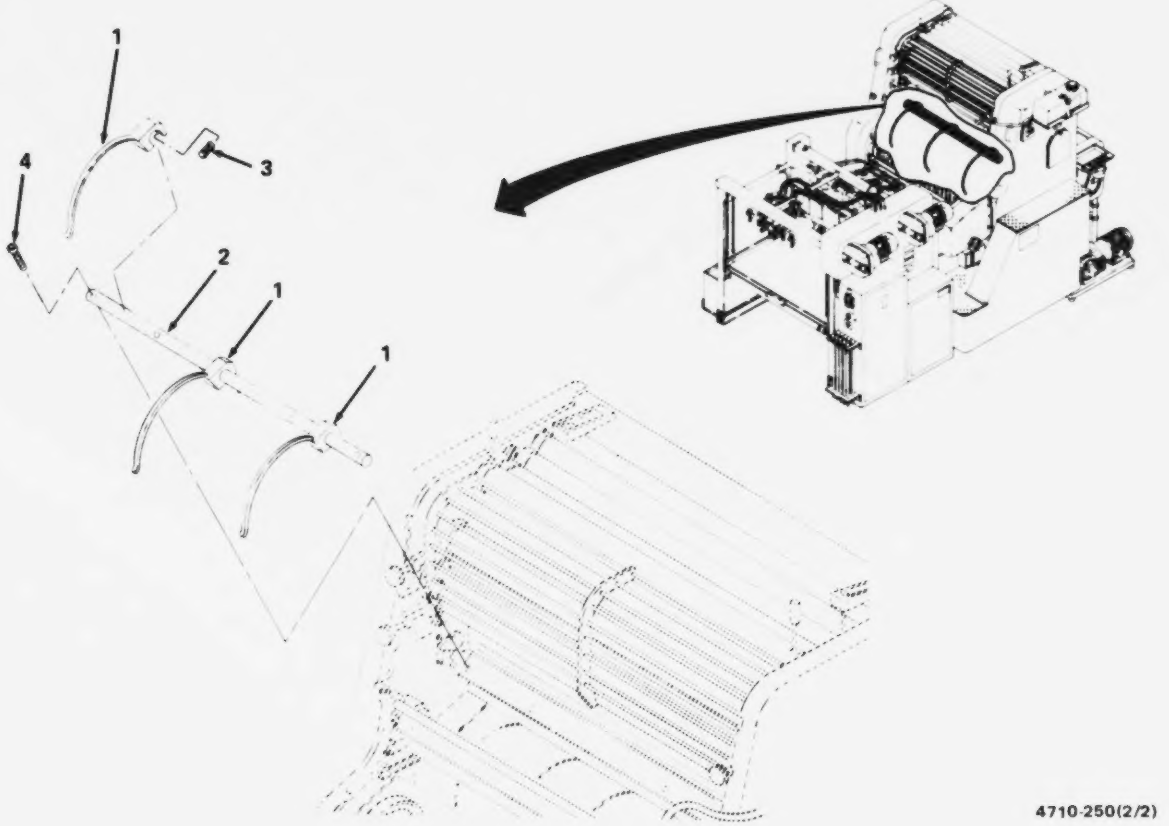

Figure 2-187. Impression Cylinder Sheet Guide Installation.

2-70. Impression Cylinder Assembly (cont).

(2) *Impression cylinder.* (figure 2-188)

(a) Install grease fittings (1).

(b) Install gear (2) in "0" position with six washers (3) and six cap screws (4). Insert two tapered pins (5).

(c) Install cam (6) with three washers (7) and three socket-head screws (8).

(d) Install each removed gripper (9) with two cap screws (10).

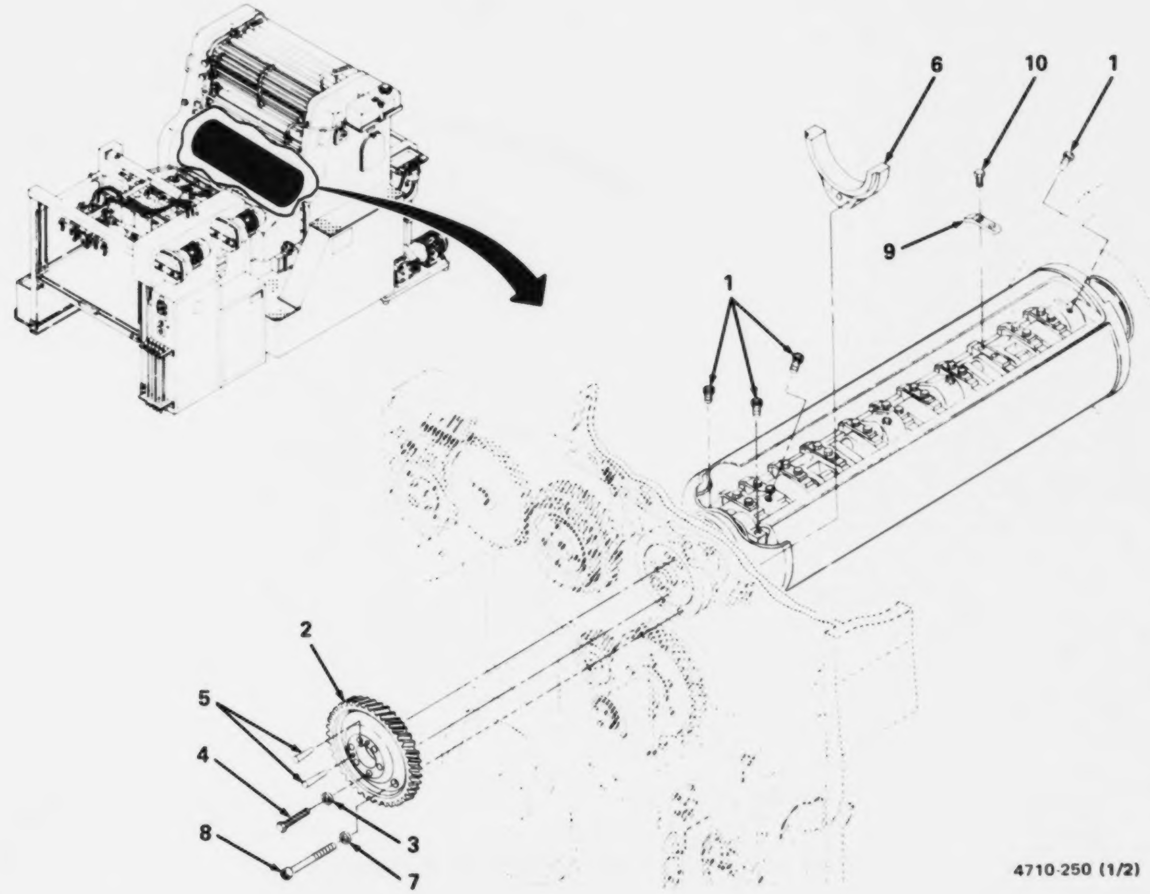

Figure 2-188. Impression Cylinder Installation.

e. *Adjust.* Adjust impression cylinder to delivery grippers if drive gear is removed using procedure described in paragraph 2-57.

NOTE

FOLLOW-ON MAINTENANCE:
(1) Install blanket cylinder drive gear (para. 2-75).
(2) Install cylinder safety guard (para. 2-65).

2-71. Engaging Lever Latch Assembly.

This task covers:	a. Remove	b. Repair	c. Install

INITIAL SETUP

Tools	*Equipment Conditions*
Retaining-ring pliers Ball-peen hammer 4 mm pin punch	Main guard assembly (D/S) removed (para. 2-20) Engaging lever compression spring removed (para. 2-36, step (1) Blanket cylinder drive gear removed (para. 2-75)

a. *Remove.* (figure 2-189)

(1) Remove two tapered pins (1).

(2) Remove spring tension pin (2) and pin (3).

(3) Remove engaging lever latch assembly (4).

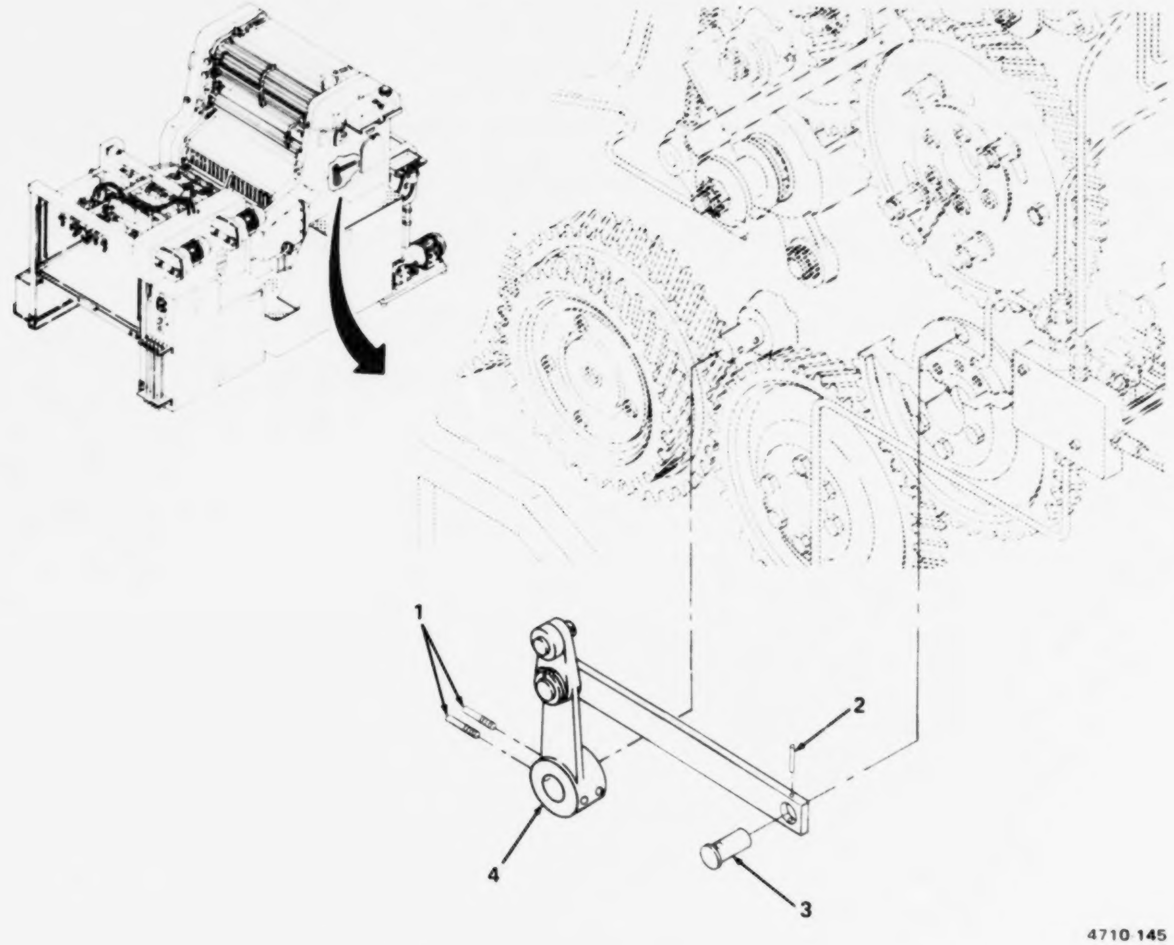
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Figure 2-189. Engaging Lever Latch Assembly Removal.

2-71. Engaging Lever Latch Assembly (cont).

b. Repair. (figure 2-190)

(1) Remove spring tension pin (1) and connecting bar (2).

(2) Remove retaining ring (3), washer (4), bolt (5), and needle bearing cage (6).

(3) Remove spring tension pin (7), pin (8), needle bushing (9), and roller (10).

(4) Replace frozen or binding needle bearing cage (6) or needle bushing (9). Replace worn roller (10).

(5) Replace needle bushing (9), roller (10), pin (8), and spring tension pin (7).

(6) Replace needle bearing cage (6), bolt (5), washer (4), and retaining ring (3).

(7) Replace connecting bar (2) and spring tension pin (1).

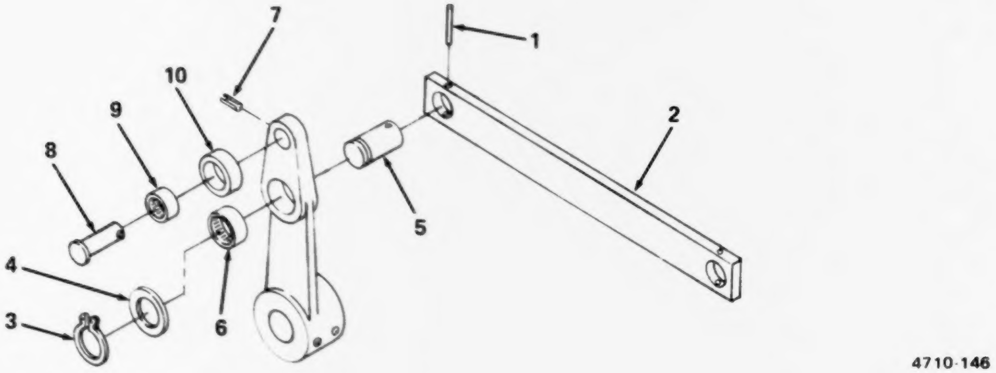


Figure 2-190. Engaging Lever Latch Assembly Repair.

c. Install. (figure 2-191)

(1) Install engaging lever latch assembly (1).

(2) Install pin (2) and spring tension pin (3).

(3) Install two tapered pins (4).

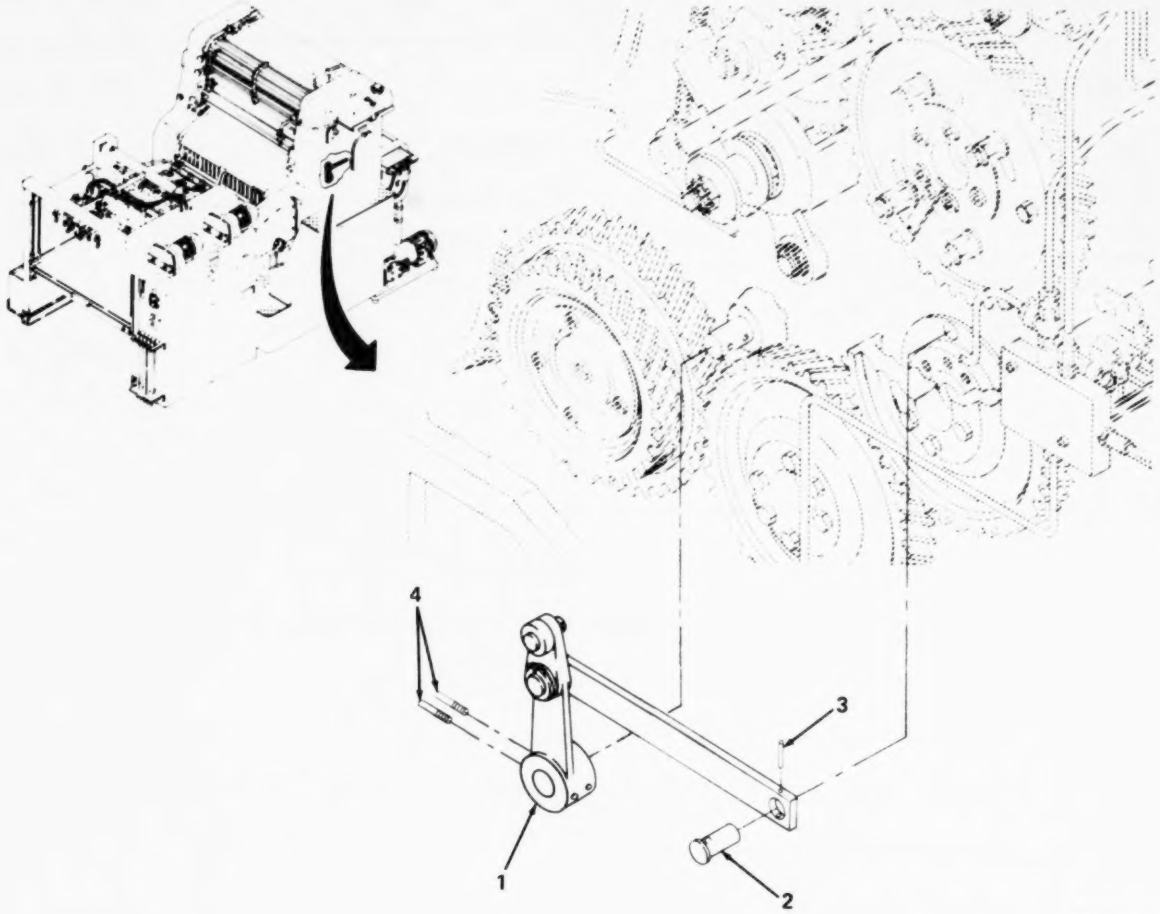


Figure 2-191. Engaging Lever Latch Installation.

NOTE

FOLLOW-ON MAINTENANCE:
(1) Blanket cylinder drive gear installed (para. 2-75).
(2) Install engaging lever compression spring (para. 2-36, steps (13) and 14)).
(3) Install main guard assembly (D/S) (para. 2-20).

2-72. Spindle and Bearing Bolt Assembly.

This task covers: a. Remove b. Repair c. Install

INITIAL SETUP

Tools

4 mm pin punch
4 mm hex key
10 mm combination wrench
17 mm combination wrench
0.050 x 0.375 x 8 in. flat-tip screwdriver
Special wrench
Ball-peen hammer

Equipment Conditions

Main guard (D/S) removed (para. 2-20)
Upper guard (O/S) removed (para. 2-18)
Blanket cylinder drive gear removed (para. 2-75)

a. Remove.

(1) *Spindle and bearing bolt assembly (D/S).* (figure 2-192)

(a) Remove two hex-head screws (1), washers (2), and oil wiper plate (3).

(b) Remove pan-head screw (4), lockwasher (5), and conical washer (6).

(c) Remove spring tension pin (7) and scaled bushing (8).

(d) Remove scaled read sleeve (9) and threaded spindle (10).

(e) Remove two hex nuts (11), lockwasher (12), and flat washer (13).

(f) Loosen screw (14) and remove oil line (15).

(g) Remove tapered pin (16) and connecting piece (17).

(h) Remove bearing bolt (18) and threaded rod (19).

(i) Remove rivet-head pin (20), two needle bushings (21), and shouldered screws (22).

(j) Remove lock nut (23) from shouldered screw (22).

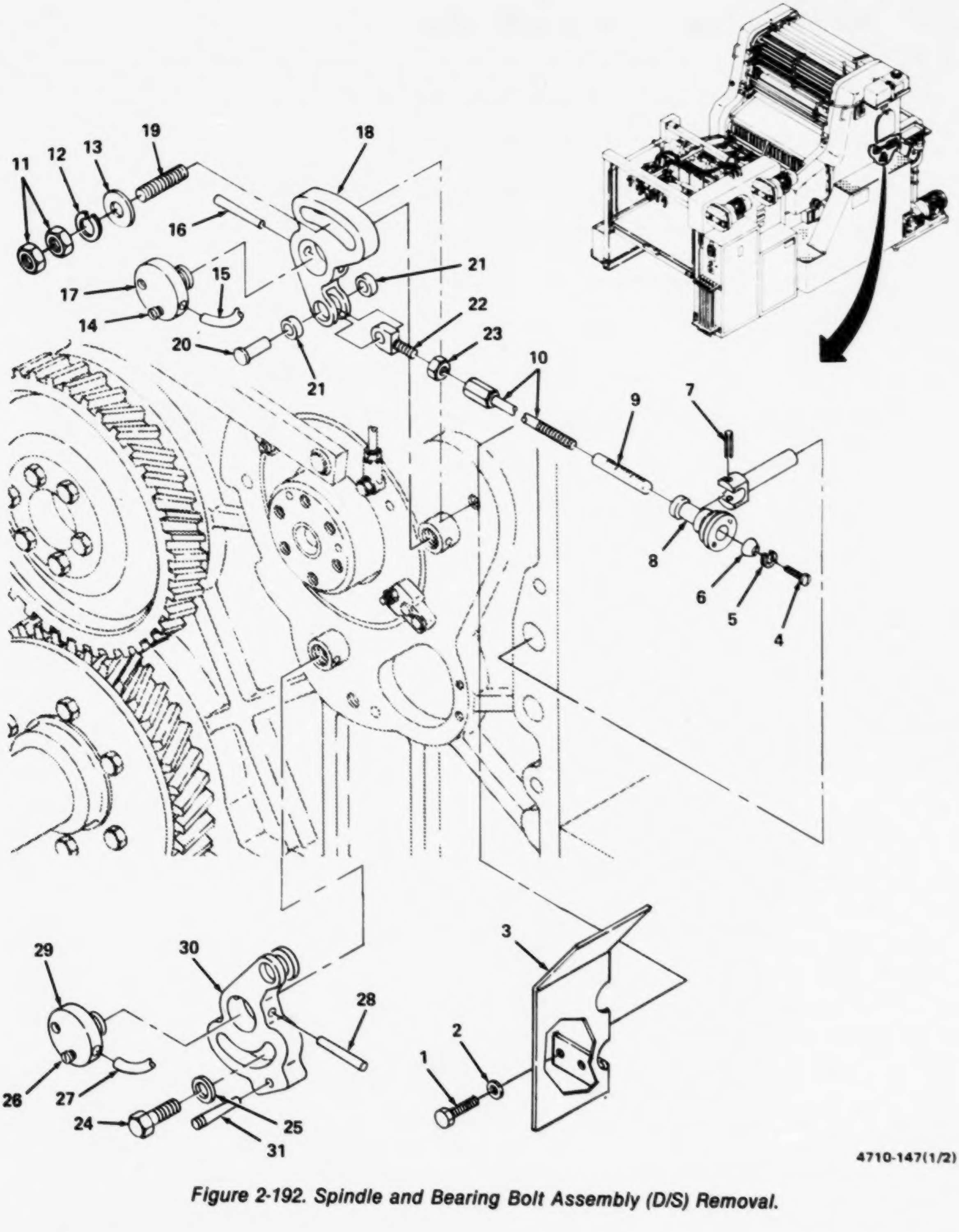
(k) Remove screw (24) and washer (25).

(l) Loosen screw (26) and remove oil line (27).

(m) Remove tapered pin (28) and connecting piece (29).

(n) Remove bearing bolt (30).

(o) Remove pin (31) from bearing bolt (30).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4710-147(1/2)

Figure 2-192. Spindle and Bearing Bolt Assembly (D/S) Removal.

2-72. Spindle and Bearing Bolt Assembly (cont).

(2) *Spindle and bearing bolt assembly (O/S).* (figure 2-193)

(a) Remove nut (1) and oil wiper plate (2).

(b) Remove pan-head screw (3), lockwasher (4), and conical washer (5).

(c) Remove spring tension pin (6) and scaled bushing (7).

(d) Remove scaled read sleeve (8) and threaded spindle (9).

(e) Remove hex nuts (10), lockwasher (11), and flat washer (12).

(f) Remove tapered pin (13) and remove bearing bolt (14) and threaded rod (15).

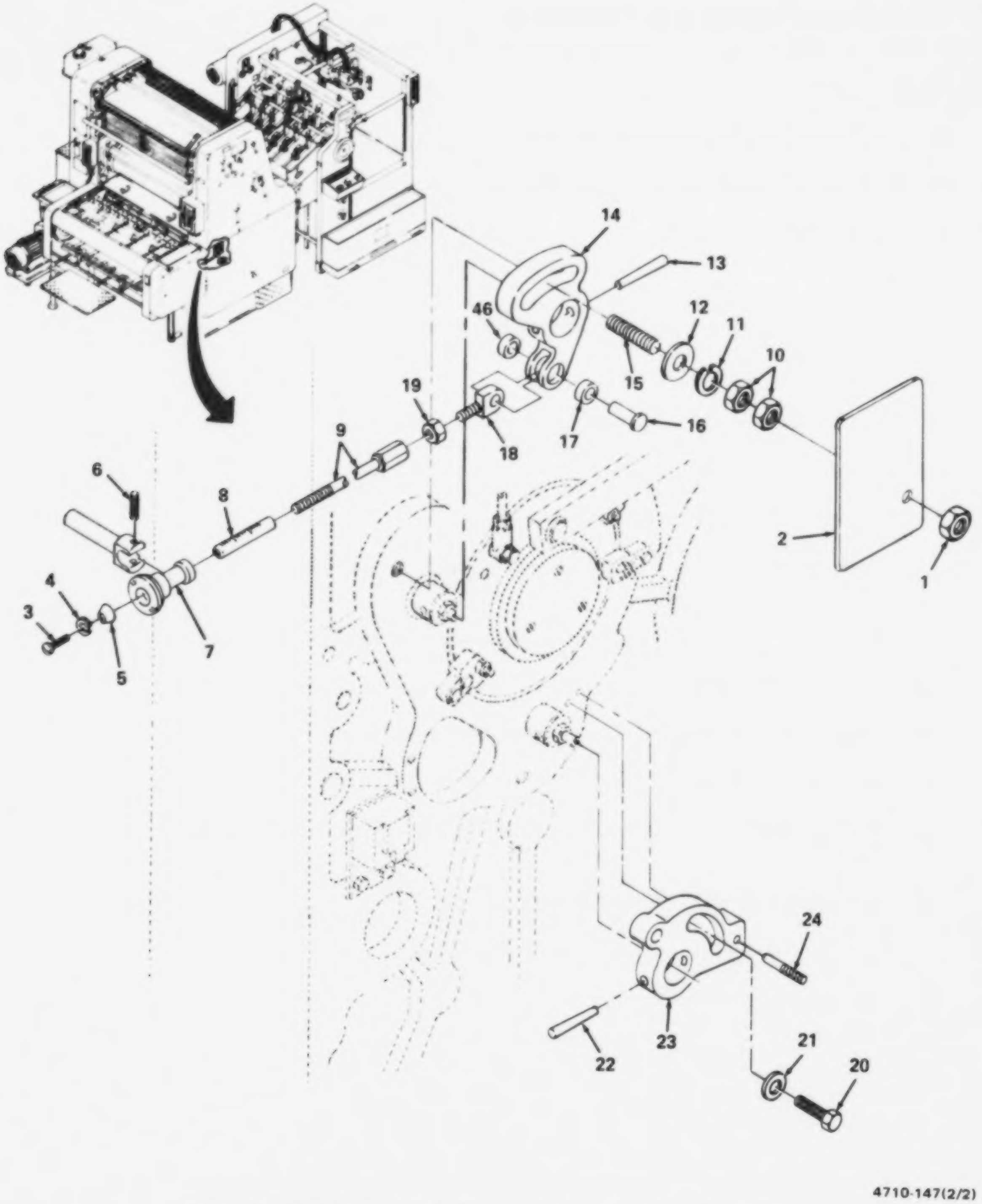
(g) Remove rivet-head pin (16), two needle bushings (17), and shouldered screw (18).

(h) Remove lock nut (19) from shouldered screw (18).

(i) Remove screw (20) and washer (21).

(j) Remove tapered pin (22) and bearing bolt (23).

(k) Remove tapered pin (24) from bearing bolt (23).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4710-147(2/2)

Figure 2-193. Spindle and Bearing Bolt Assembly (O/S) Removal.

2-72. Spindle and Bearing Bolt Assembly (cont).

b. *Repair.*

(1) Repair worn or damaged needle bushings.

(2) Replace worn or damaged threaded bushings.

(3) Replace missing hardware.

c. *Install.*

(1) *Spindle and bearing bolt assembly (O/S).* (figure 2-194)

(a) Install tapered pin (1) in bearing bolt (2).

(b) Position bearing bolt (2) on press and install tapered pin (3).

(c) Install washer (3) and screw (4).

(d) Install lock nut (5) on shouldered screw (6).

(e) Aline shouldered screw (6) in bearing bolt (7) and install two needle bushings (8) and rivet-head pin (9).

(f) Install threaded rod (10), position bearing bolt on press and replace tapered pin (11).

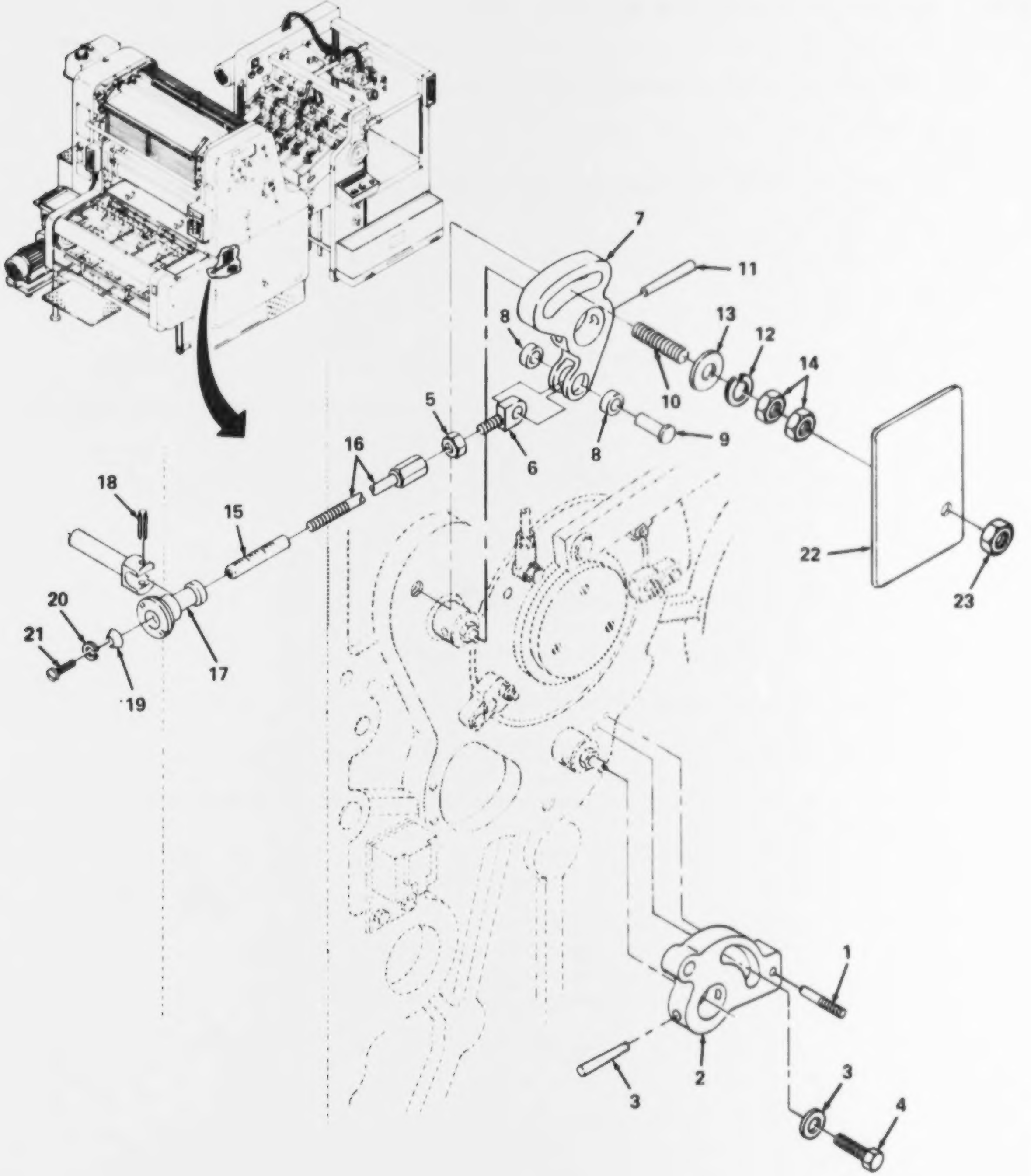
(g) Replace lockwasher (12), flat washer (13), and two hex nuts (14).

(h) Replace scaled read sleeve (15) and threaded spindle (16).

(i) Replace scaled bushing (17) and spring tension pin (18).

(j) Replace threaded bushing , conical washer (19), lockwasher (20), and pan-head screw (21).

(k) Replace oil wiper plate (22) and nut (23).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4710-280 (2/2)

Figure 2-194. Spindle and Bearing Bolt Assembly (O/S) Installation.

2-72. Spindle and Bearing Bolt Assembly (cont).

(2) *Spindle and bearing bolt assembly.* (figure 2-195)

(a) Install pin (1) in bearing bolt (2).

(b) Install bearing bolt (2) on press and replace tapered pin (3) and connecting piece (4).

(c) Install oil line (5) and tighten screw (6).

(d) Install washer (7) and screw (8).

(e) Install lock nut (9) on shouldered screw (10).

(f) Aline shouldered screw (10) in bearing bolt (11) and replace two needle bushings (12) and rivet-head pin (13).

(g) Install threaded rod (14), position bearing bolt (11) on press and install tapered pin (15) and connecting piece (16).

(h) Install oil line (17) and tighten screw (18).

(i) Install flat washer (19), lockwasher (20), and two hex nuts (21).

(j) Install sealed read sleeve (22) and threaded spindle (23).

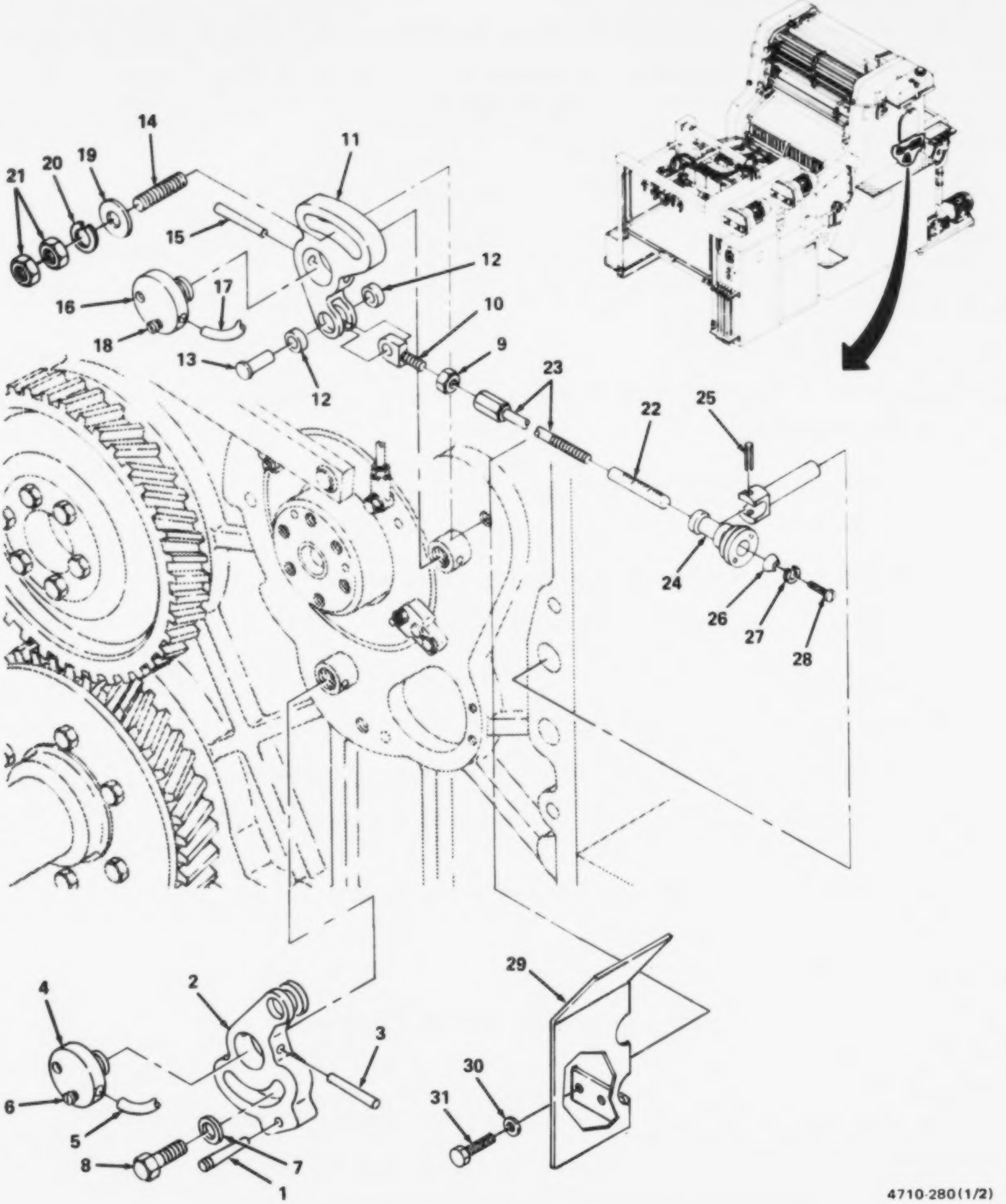
(k) Install scaled bushing (24) and spring tension pin (25).

(l) Install conical washer (26), lockwasher (27), and pan-head screw (28).

(m) Position oil wiper plate (29) on press and replace two washers (30) and hex-head screws (31).

NOTE

FOLLOW-ON MAINTENANCE:
(1) Install blanket cylinder drive gear (para. 2-75).
(2) Install upper guard (O/S) (para. 2-18).
(3) Install main guard (D/S) (para. 2-20).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4710-280(1/2)

Figure 2-195. Spindle and Bearing Bolt Assembly (D/S) Installation.

2-73. Deflector Assembly.

This task covers: a. Remove b. Repair c. Install

INITIAL SETUP

Tools

Retaining-ring pliers
4 mm pin punch
Ball-peen hammer
8 mm combination wrench
10 mm combination wrench
19 mm combination wrench

Equipment Conditions

Upper guard (O/S) removed (para. 2-18)

Additional Personnel Requirement

Printing and Binding Specialist MOS 83F20

a. Remove. (figure 2-196)

(1) Remove hex nut (1) and cover plate (2).

(2) Remove spring (3) from control lever (4).

(3) Remove hex nut (5) and spring retainer plate (6) from control lever (4).

(4) Remove pin (7) and move rod (8) away from lever (4).

(5) Remove retaining ring (9), washer (10), and control lever (4) from shaft (11).

(6) Remove retaining ring (12) and washer (13).

(7) Remove spring tension pin (14), snap lever (15) with spring rod assembly (16).

(8) Remove external retaining ring (17), washer (18), roller (19), and spring rod assembly (16).

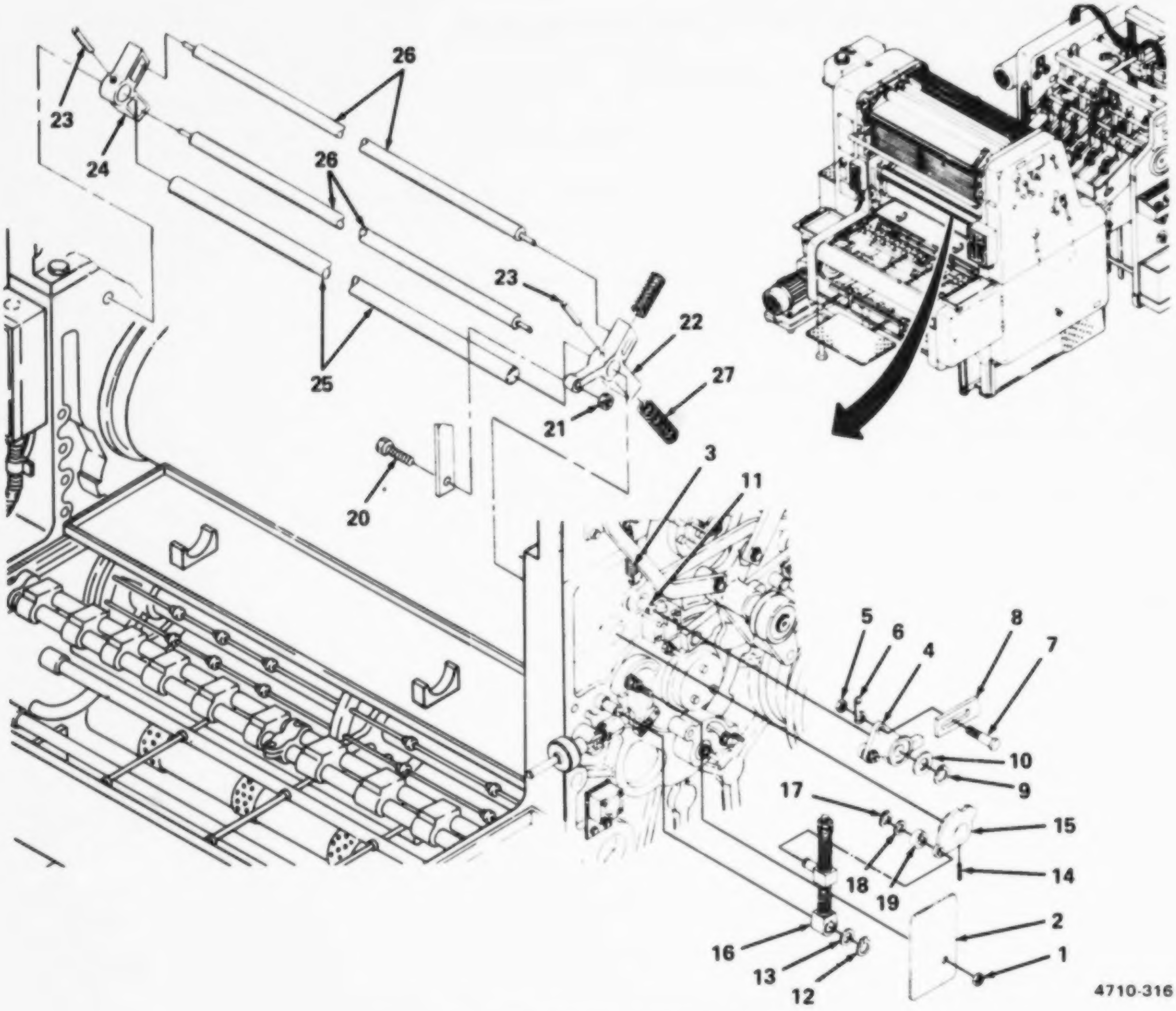
(9) Remove hex screw (20) and hex nut (21) from guide piece (22).

(10) Remove two spring tension pins (23) from guide piece (22) and (24).

(11) Remove shaft (25) through O/S frame.

(12) Remove finger protecting bars (26) and guide pieces (22) and (24).

(13) Remove compress springs (27) from guide pieces (22) and (24).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4710-316

Figure 2-196. Deflector Assembly Removal.

b. Repair.

(1) Replace broken or weak compression springs.

(2) Replace worn or damaged snap lever.

(3) Replace bent finger guards.

2-73. Deflector Assembly (cont).

c. *Install.* (figure 2-197)

(1) Install compression springs (1) in guide pieces (2) and (3).

(2) Install finger protection bars (4) in guide pieces (2) and (3).

(3) Install shaft (5) and spring tension pins (6).

(4) Install hex screw (7) and hex nut (8) in guide piece (2).

(5) Install spring rod assembly (9), roller (10), washer (11), and retaining ring (12) on snap lever (13).

(6) Install snap lever (13) on shaft (5) and spring rod assembly on stud (14).

(7) Install spring tension pin (15), washer (16), and retaining ring (17).

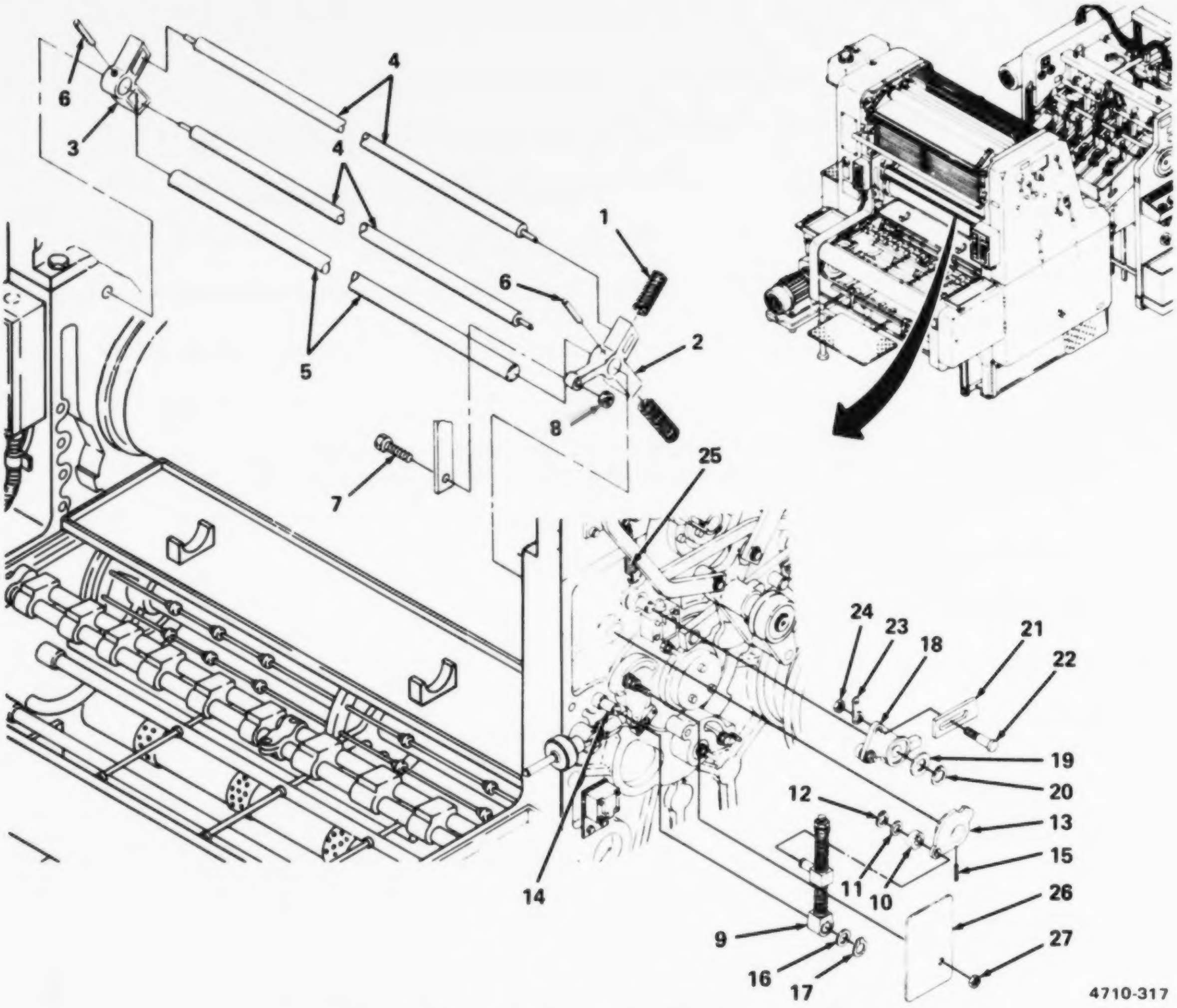
(8) Install control lever (18), washer (19), and retaining ring (20).

(9) Install rod (21) and pin (22).

(10) Install spring retainer (23) and hex nut (24) on control lever (18).

(11) Install spring (25) on spring retainer (23).

(12) Install cover plate (26) and hex nut (27).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4710-317

Figure 2-197. Deflector Assembly Installation.

NOTE

FOLLOW-ON MAINTENANCE:
(1) Install upper guard (O/S) (para. 2-18).
(2) Aline safety limit switch (para. 2-74).

2-74. Deflector Safety Limit Switch.

This task covers: a. Test b. Replace c. Aline

INITIAL SETUP

Tools

1 mm feeler gage
Multimeter
0.050 x 0.375 x 8 in. flat-tip screwdriver
No. 2 x 4 in. cross-tip screwdriver

Equipment Coditions

Upper guard (O/S) removed (para. 2-18)

Additional Personnel Requirement

Electrician MOS 35E20

a. Test. (figure 2-198)

NOTE

Some switches are wired into the same circuit, for example, upper and lower limit switches. Refer to table 2-5, Troubleshooting, to determine switch to be tested.

(1) Loosen two screws (1) and open hinged cover (2).

(2) Set multimeter to 0 ohms scale.

(3) Test for continuity (para. 2-16) at terminals (3).

(4) If no continuity (in either plunger position), replace switch.

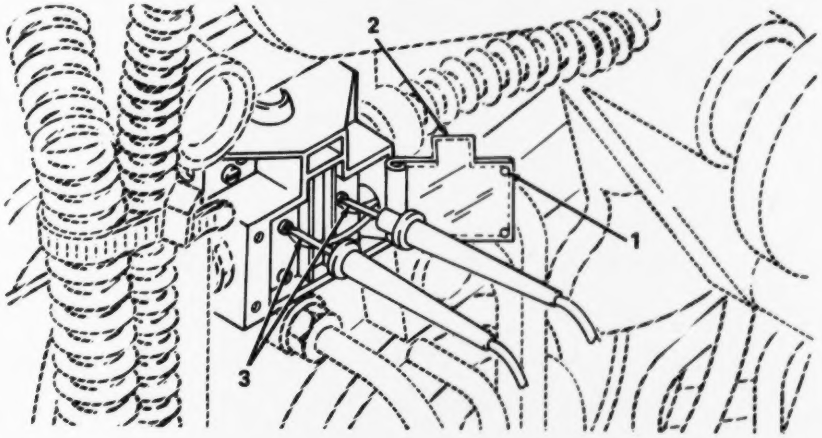


Figure 2-198. Deflector Safety Limit Switch Test.

b. ***Replace***. (figure 2-199)

NOTE

Wiring on the printing press is pretagged and matched to its connecting terminal. Retag wires before replacing.

(1) Loosen two screws (1) and open hinged cover (2).

NOTE

There are two sets of leads to run wiring to another switch.

(2) Loosen retaining screws (3) and remove and tag leads (4) on both cables (5).

(3) Remove two cable collars (6) and remove cables (5) from limit switch (7).

(4) Remove two screws (8) and limit switch (7).

(5) Replace limit switch (7) and two screws (8).

(6) Install cables (5) into limit switch (7) and tighten cable collars(6).

(7) Install leads (4) and tighten retaining screws (3).

(8) Close the hinged cover (2). Tighten two screws (1).

(9) Aline limit switch (para. c).

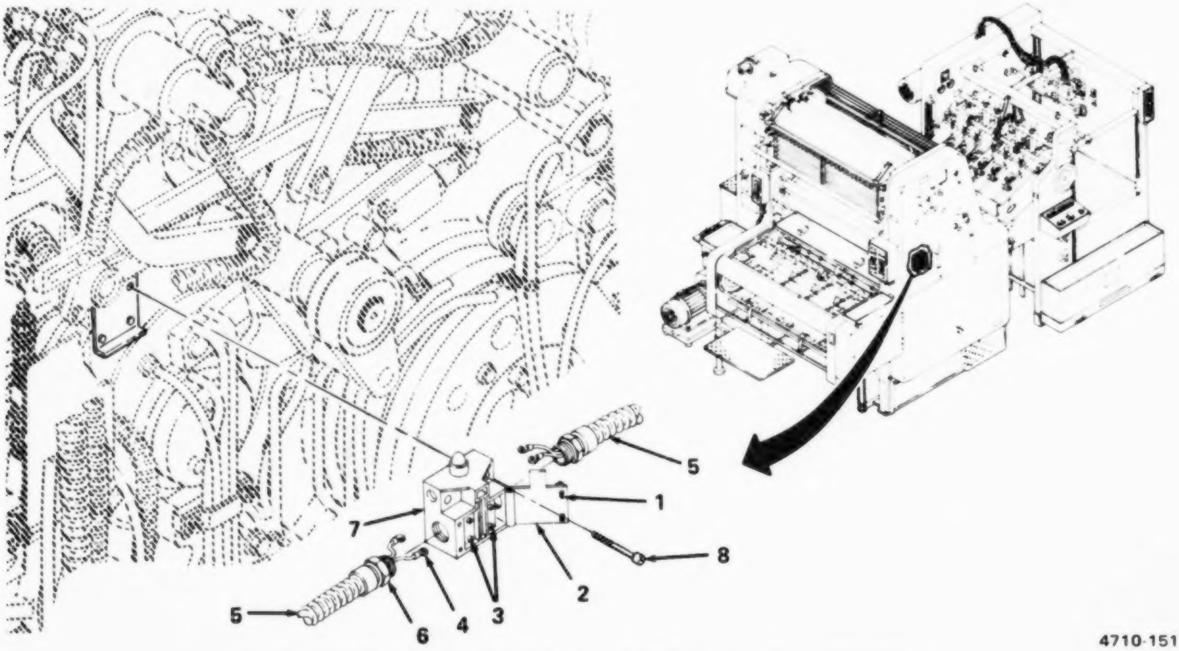


Figure 2-199. Deflector Safety Limit Switch Replacement.

2-74. Deflector Safety Limit Switch (cont).

c. *Aline.* (figure 2-200)

NOTE

Safety limit switches on printing press open (or close) contacts after switch plunger is depressed (or not depressed). Plunger travels 1 mm between opening and closing of contacts regardless of the type of actuator or push rod that presses or releases the plunger. Mounting screws are the same for all switches.

(1) Loosen two screws (1).

(2) Using feeler gage, aline plunger to allow 1 mm space between plunger (2) and lever (3).

(3) Tighten two screws (1).

(4) Recheck measurement with feeler gage.

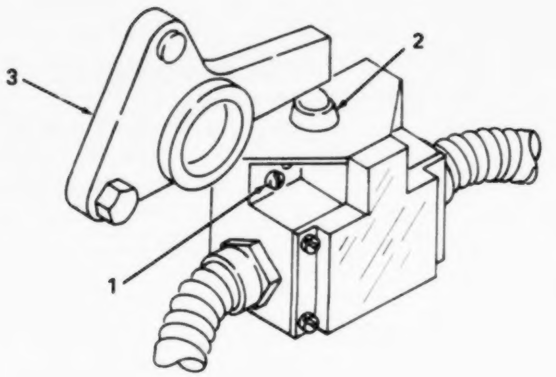


Figure 2-200. Deflector Safety Limit Switch Alinement.

NOTE

FOLLOW-ON MAINTENANCE:
Install upper guard (O/S) (para. 2-18).

2-75. Blanket Cylinder Assembly.

This task covers: a. Repair b. Adjust

INITIAL SETUP

Tools	*Equipment Conditions*
4 mm hex key 6 mm hex key 8 mm hex key 8 mm combination wrench 11 mm combination wrench 19 mm combination wrench 1.0 x 6.0 x 0.5 flat-tip screwdriver Feeler gage Wrench, special, U-shape Machinist's rule Stud remover housing Stud remover collet	Main guard assembly removed (para. 2-20) Upper guard (O/S) removed (para. 2-18) Deflector assembly raised (para. 2-73) Lubrication line from gear box to manual valve removed (para. 2-78)

a. *Repair.*

(1) *Blanket adjustment assembly.* (figure 2-201)

(a) Remove two socket-head screws (1), washers (2), and supporting piece (3).

(b) Remove worm gear (4) from flange bearing housing (5).

(c) Remove two needle bushings (6).

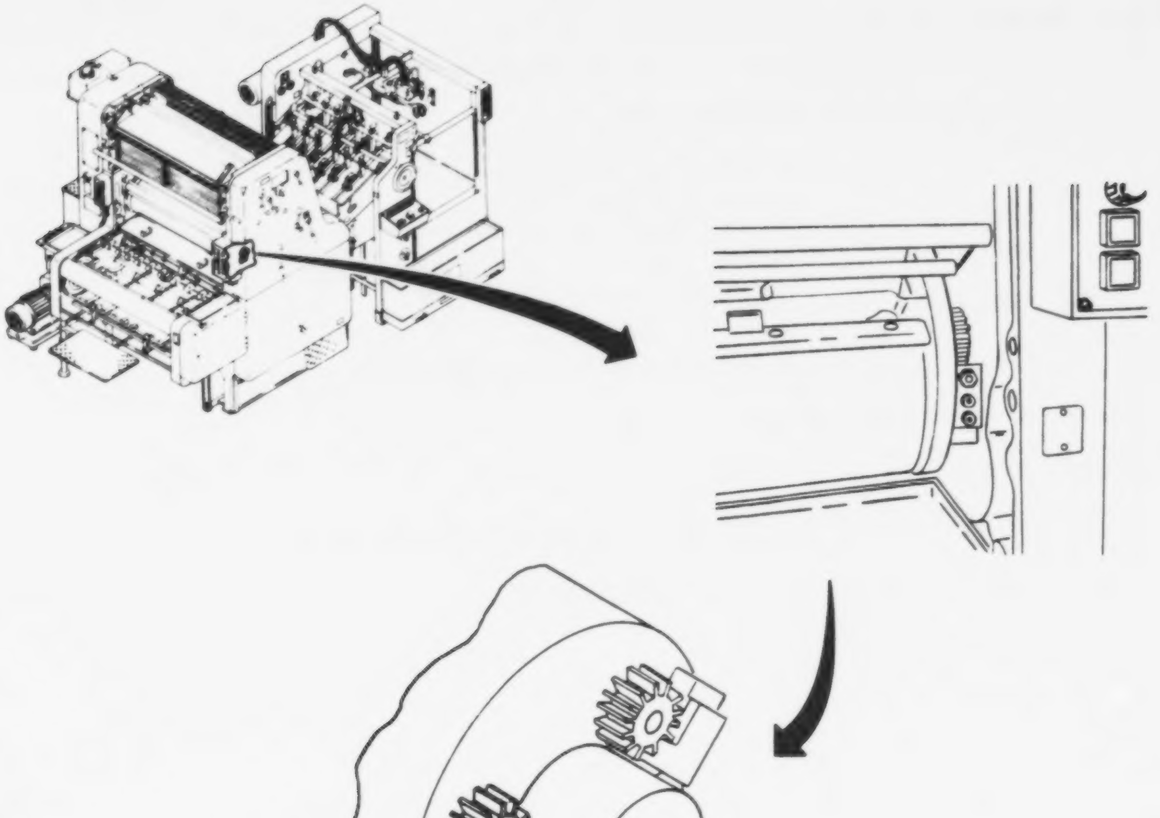
(d) Replace worn worm gear (4). Replace frozen or binding needle bushings (6).

(e) Replace two needle bushings (6).

(f) Replace worm gear (4) in flange bearing housing (5).

(g) Replace supporting piece (3) so that worm gear (4) shaft is seated in needle bushing in supporting piece.

(h) Replace supporting piece (3), two washers (2), and socket-head screws (1).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4710-154

Figure 2-201. Blanket Cylinder Adjustment Assembly Repair.

2-75. Blanket Cylinder Assembly (cont).

(2) *Blanket cylinder drive gear.* (figure 2-202)

NOTE

Gear is not repairable but must be removed to permit access to other, repairable, press assemblies.

(a) Set press to "O" position.

(b) Place wooden blocks under blanket cylinder to prevent rotation when gear is removed.

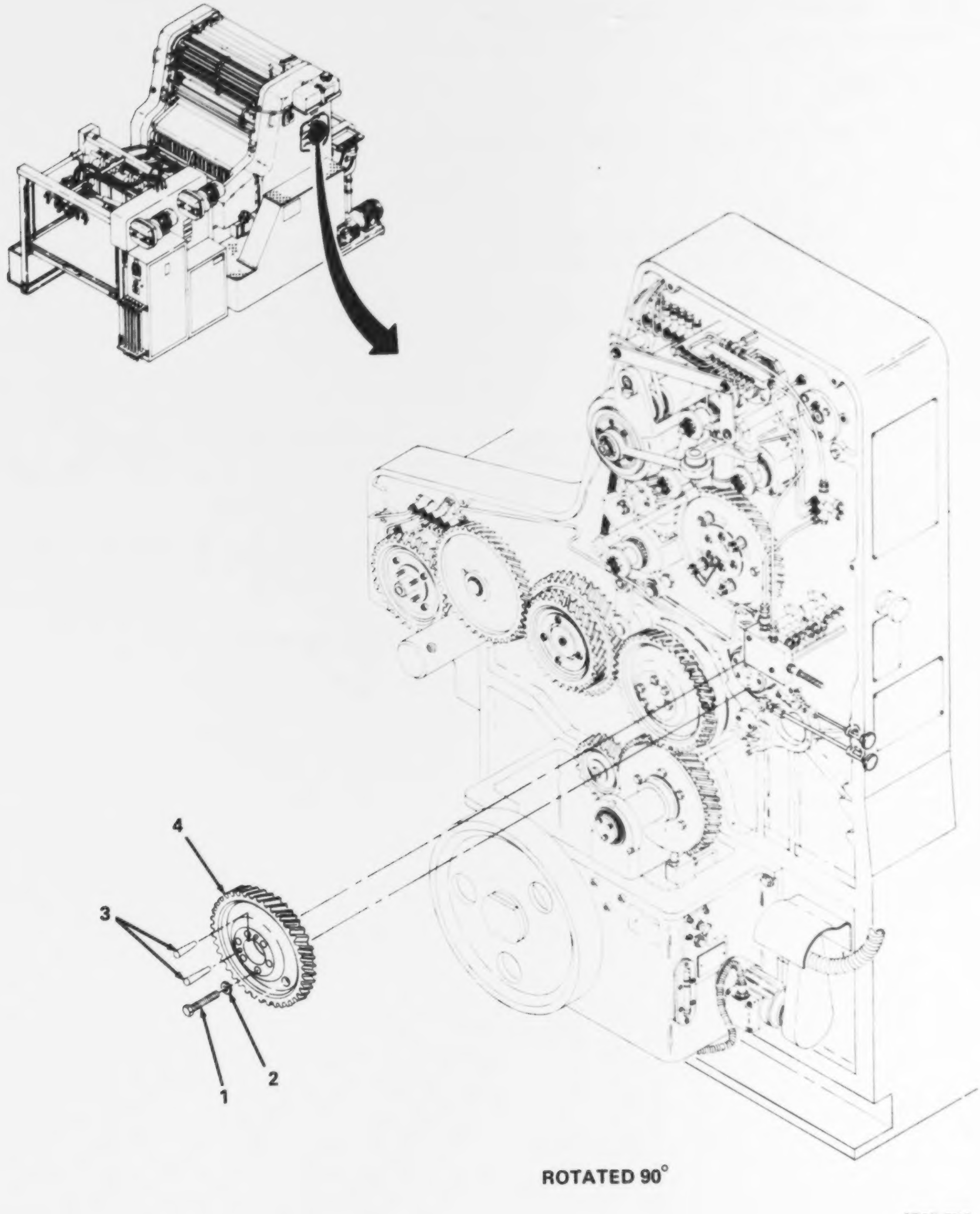
(c) Remove six hex-head bolts (1) and washers (2).

(d) Remove two locator pins (3) and gear (4).

(e) Position gear (4) on press in "O" position and replace locator pins (3).

(f) Replace six washers (2) and six hex-head bolts (1).

(g) Remove wooden blocks.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4710-286

Figure 2-202. Blanket Cylinder Drive Gear Repair.

2-75. Blanket Cylinder Assembly (cont).

a. *Adjust.*

(1) *Brake spring at cylinder bearing.* (figure 2-203)

NOTE

Six cup springs (1) located in bearing housing (2) slow down rotation of the bearing assembly to a predetermined speed by application of pressure.

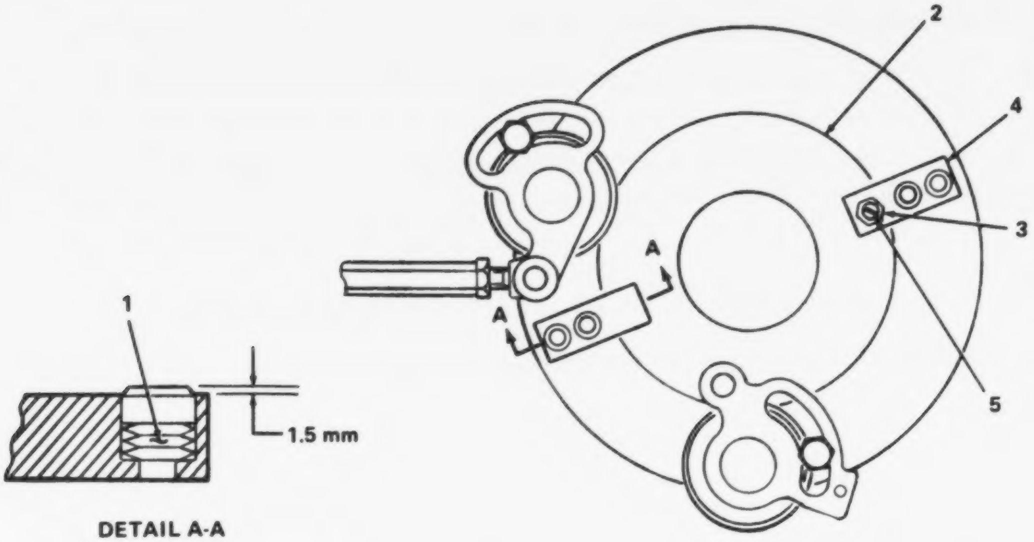
(a) Loosen stop nuts (3) on retaining pieces (4).

CAUTION

Use care when adjusting retaining pieces to the blanket cylinder bearing assembly. Cylinder rotation can be blocked and functioning of the impression control mechanism can be degraded.

(b) Tighten slotted adjusting screws (5) until they meet resistance. Impression control lever should now be hard to move when operated by hand. Continue to tighten both screws until this condition exists.

(c) Fix position of adjustment screws (5) by tightening stop nuts (3).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4710-020

Figure 2-203. Brake Spring at Blanket Cylinder Bearing Adjustment.

2-75. Blanket Cylinder Assembly (cont).

(2) *Spring loaded supporting rollers.* (figure 2-204)

(a) Remove two hex-head screws (1) and covers (2) and O/S and D/S of delivery end of press.

(b) Tighten roller spring bolts (3) on O/S and D/S until top surface of washer (4) is 11 mm below surface of the side frame (5).

NOTE

At this spring compression, spring pressure of 600 Kg is achieved.

(c) Replace O/S and D/S covers (2) and replace two hex-head screws (1).

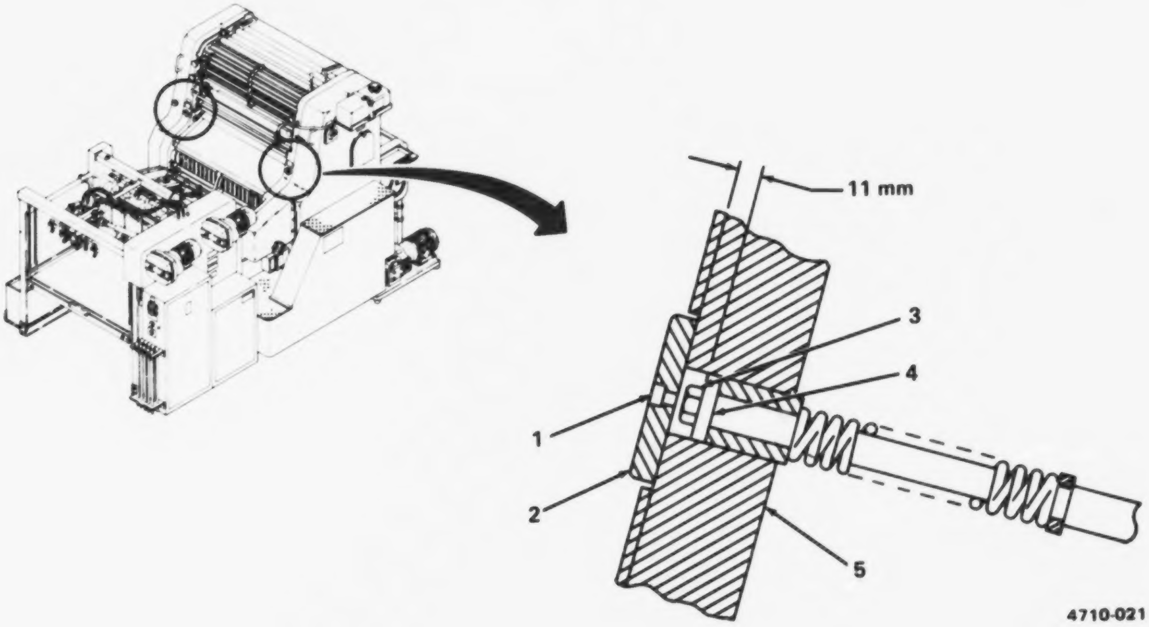


Figure 2-204. Spring Loaded Supporting Rollers, Blanket Cylinder, Adjustment.

(3) ***Blanket cylinder to impression cylinder adjustment.*** (figure 2-205)

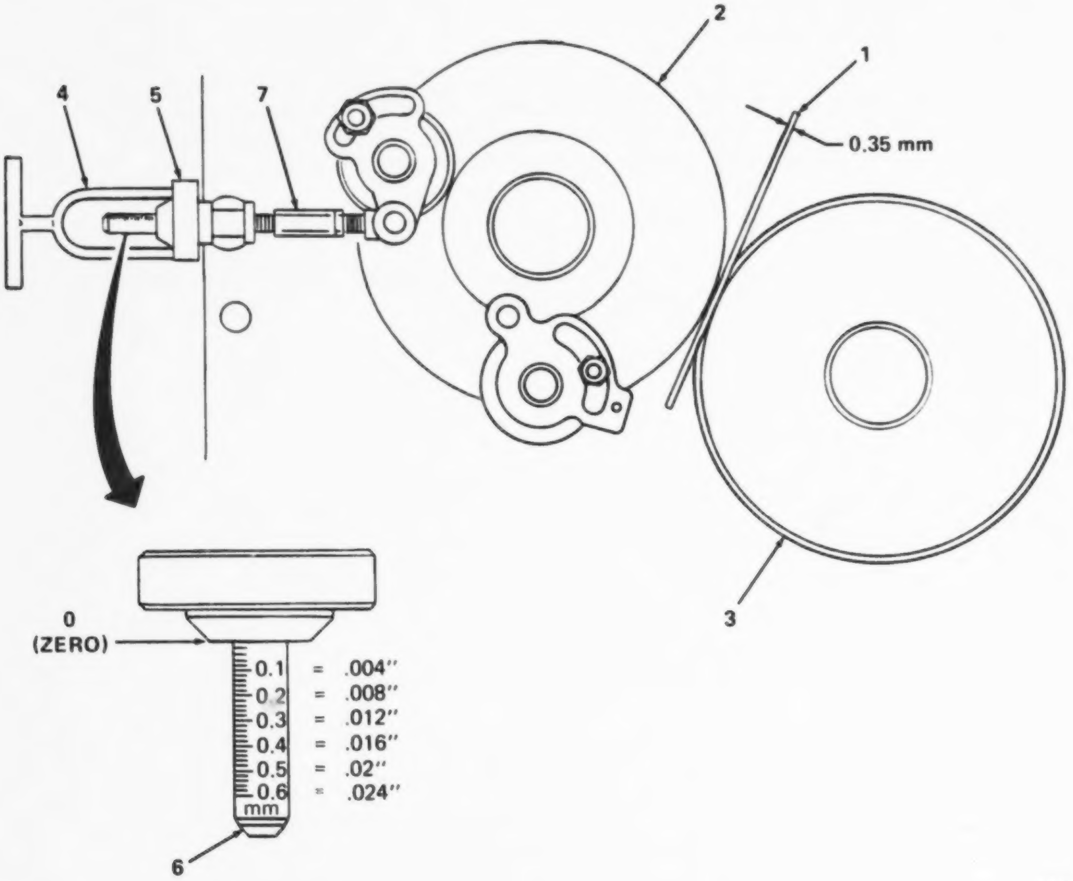
(a) Turn flywheel to put press in "0" position. (Line up marks on drive gears).

(b) Using manual lever, put press in impression ON.

(c) Insert 0.35 mm feeler gage (1) between the bearer rings of the blanket (2) and impression cylinders (3) at D/S and O/S.

(d) Using special wrench (4), turn upper pressure adjusting ring (5) to set sealed bushings (6) at D/S and O/S to "0".

(e) Turn hexagonal spacer bushing (7) of adjustment bolt until the steel gages can be pulled out with slight binding.



4710-022

Figure 2-205. Blanket Cylinder to Impression Cylinder Adjustment.

2-75. Blanket Cylinder Assembly (cont).

(4) *Blanket cylinder to plate cylinder adjustment.* (figure 2-206)

(a) With press still in impression ON, insert a 0.1 mm feeler gage (1) between the bearer rings of the blanket cylinder (2) and the plate cylinder (3) at D/S and O/S.

(b) Loosen lock nut (4) on eccentric lever (5) and rotate D/S and O/S eccentric levers toward delivery end of press until feeler gage can be pulled out with slight binding.

(c) Using ruler, measure distance "X" between center of hole in eccentric and center of hole in side frame.

NOTE

A more exact measurement can be made if a bolt of about 22 mm is inserted into the hole in the side frame and a bolt of about 12 mm is inserted in the hole in the eccentric. Measurements are taken from the center of each bolt head.

(d) Set press to impression OFF.

(e) Decrease the distance "X" measured in step c above by exactly 9 mm (± – 0.1 mm) by rotating D/S and O/S eccentrics (5) as required.

(f) Tighten lock nut (4) on D/S and O/S.

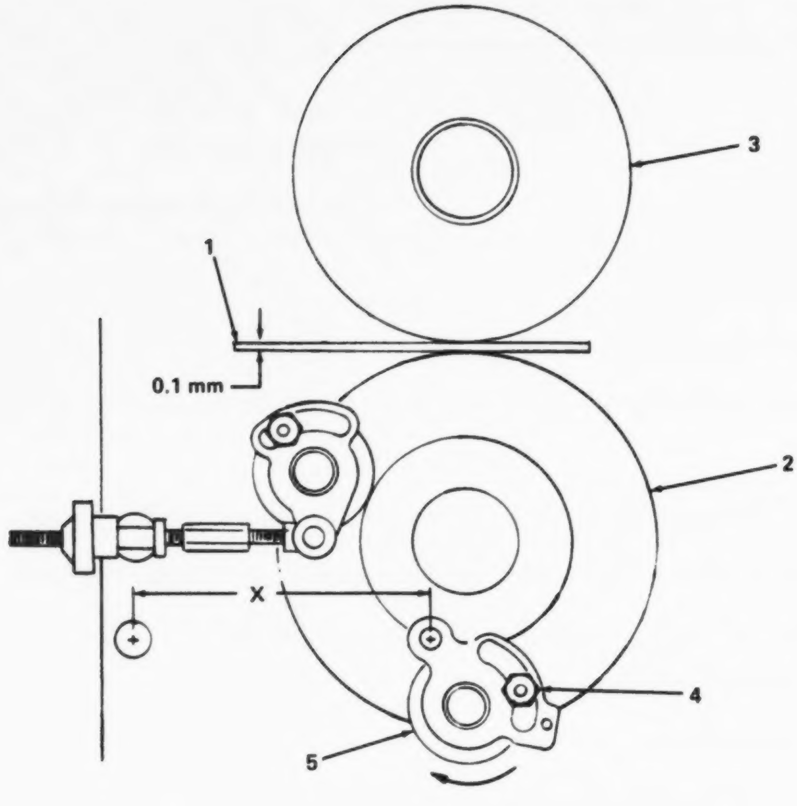


Figure 2-206. Blanket Cylinder to Plate Cylinder Adjustment.

NOTE

FOLLOW-ON MAINTENANCE:
(1) Lower deflector assembly (para. 2-73).
(2) Install upper guard (O/S) (para. 2-18).
(3) Install main guard assembly (para. 2-20).

2-76. Cover Plate Assembly (Blanket Cylinder).

This task covers: a. Replace b. Repair

INITIAL SETUP

Tools	*Equipment Conditions*
6 mm hex key	Upper guard (O/S) removed (para. 2-18)

a. Replace. (figure 2-207)

(1) Remove three socket-head screws (1), washers (2), and cover plate (3).

(2) Remove cup spring washers (4), bearing disc (5), and axial needle bearing (6).

NOTE

Number of cup spring washers will vary between printing presses.

(3) Replace axial needle bearing (6), bearing disc (5), and cup spring washers (4).

(4) Replace cover plate (3), washers (2), and three socket-head screws (1).

b. Repair. (figure 2-106)

(1) Replace flattened or deformed cup spring washers (4).

(2) Replace frozen or binding axial needle bearing (6).

(3) Replace worn bearing disc (5).

(4) Add cup washers (4) as needed to reduce blanket cylinder end play.

NOTE

FOLLOW-ON MAINTENANCE:
Replace upper guard (O/S) (para. 2-18).

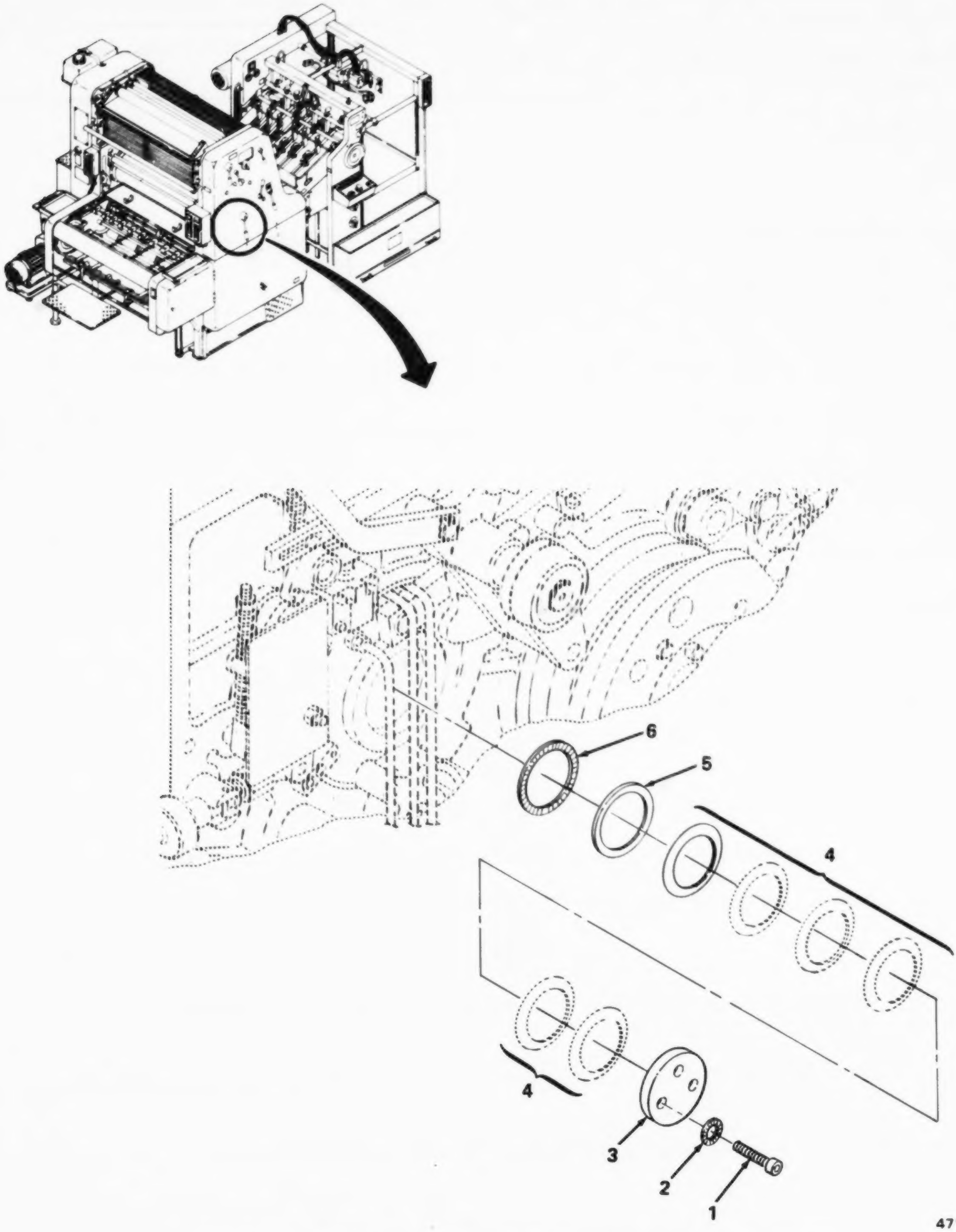

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Figure 2-207. Cover Plate Assembly (Blanket Cylinder) Replacement.

2-77. Gear Box Assembly.

This task covers: a. Remove b. Repair c. Install

INITIAL SETUP

Tools

10 mm combiantion wrench
13 mm combination wrench
17 mm combination wrench
19 mm combination wrench
5 mm hex key
6 mm hex key
8 mm hex key
10 mm hex key
Pipe wrench
Pulley puller
Retaining-ring pliers
0.050 x 0.375 x 8 in. flat-tip screwdriver

Equipment Conditions

Main guard (D/S) removed (para. 2-20)
Belt guard removed (para. 2-17)

Equipment Conditions (cont)

V-belt removed (para. 2-80)
Oil drained from gear box

Additional Personnel Requirement

Two Printing and Binding Specialists
MOS 83F20

General Safety Instructions

WARNING

HEAVY EQUIPMENT. Use care and proper lifting techniques when removing or installing gear box assembly. Failure to do so may result in serious personal injury.

---

a. Remove. (figure 2-208)

WARNING

Pulley exceeds 35 pounds. Use two persons to perform step (1).

(1) Remove set screw (1), threaded cover (2), V-belt pulley (3), and packing ring (4).

(2) Remove three socket-head screws (5) and oil line (6).

WARNING

Gear box (7) greatly exceeds 35 pounds. Use three persons to perform steps (2) through (7).

(3) Support gear box (7) with wooden blocks and remove two socket-head screws (8) from behind press D/S frame

(4) Remove four hex-head screws (9), washers (10), and two locator pins (11).

CAUTION

Use care not to damage drive gear when performing step (5).

(5) Lower gear box (7) to the floor.

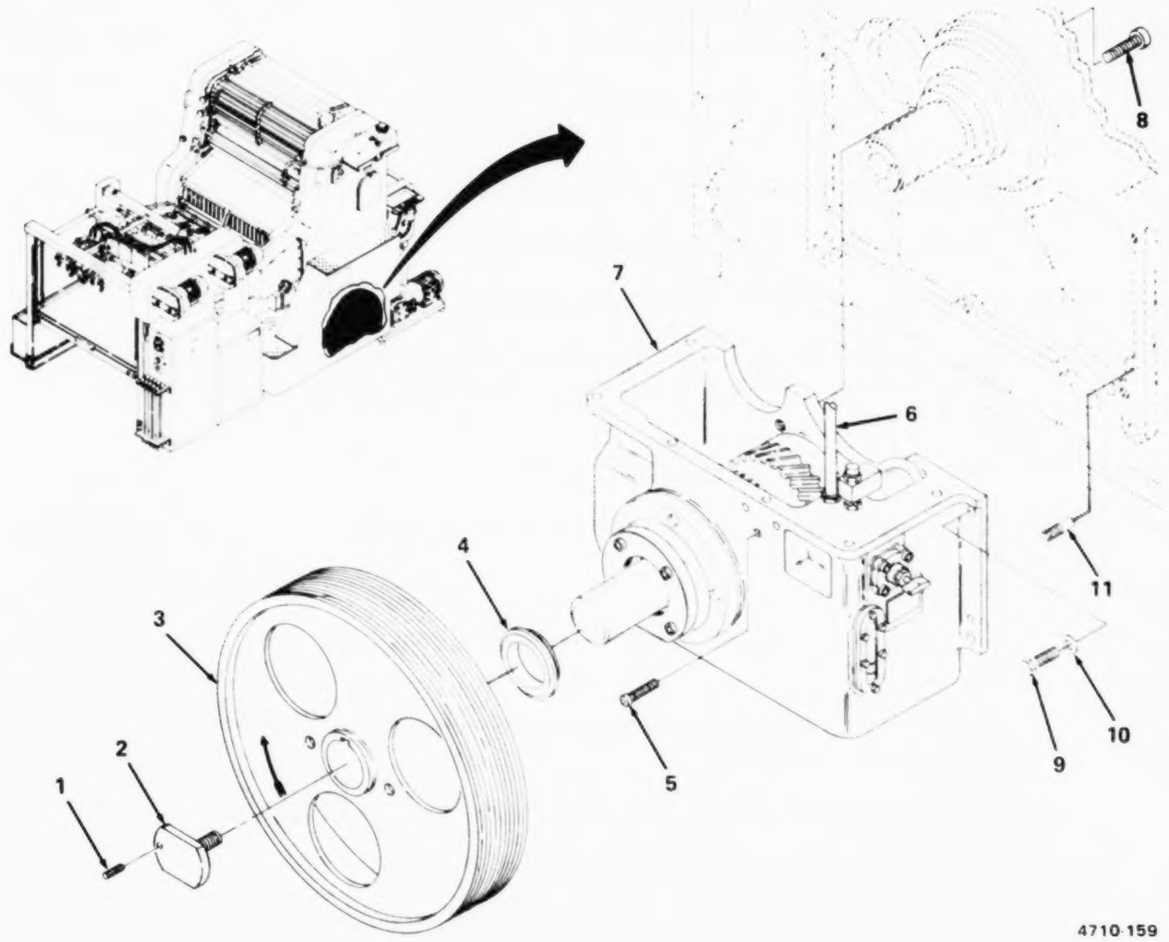
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Figure 2-208. Gear Box Assembly Removal.

2-77. Gear Box Assembly (cont).

b. *Repair.*

(1) *Disassembly.*

(a) *Lubrication system pump and accessories.* (figure 2-209)

1 Loosen fitting (1) and separate oil tube (2) from lubrication pump (3).

2 Remove fitting (4), oil tube (5), and fitting (6).

3 Remove four socket-head screws (7), washers (8), bearing flange (9), and bearing (10).

4 Remove two socket-head screws (11), washers (12), and bearing bracket (13).

5 Remove suction screen (14), fitting (15), and oil tube (16).

6 Loosen retaining ring (17) and slide out of groove in pump shaft.

7 Remove two socket-head screws (18) and washers (19) and separate lubrication pump (3) from bearing bracket (13). This allows pinion gear (20) to slide off pump shaft with retaining ring (17).

8 Remove relief valve (21) and packing ring (22).

9 Remove connecting piece (23) and separate from oil tube (2).

10 Remove fitting (24).

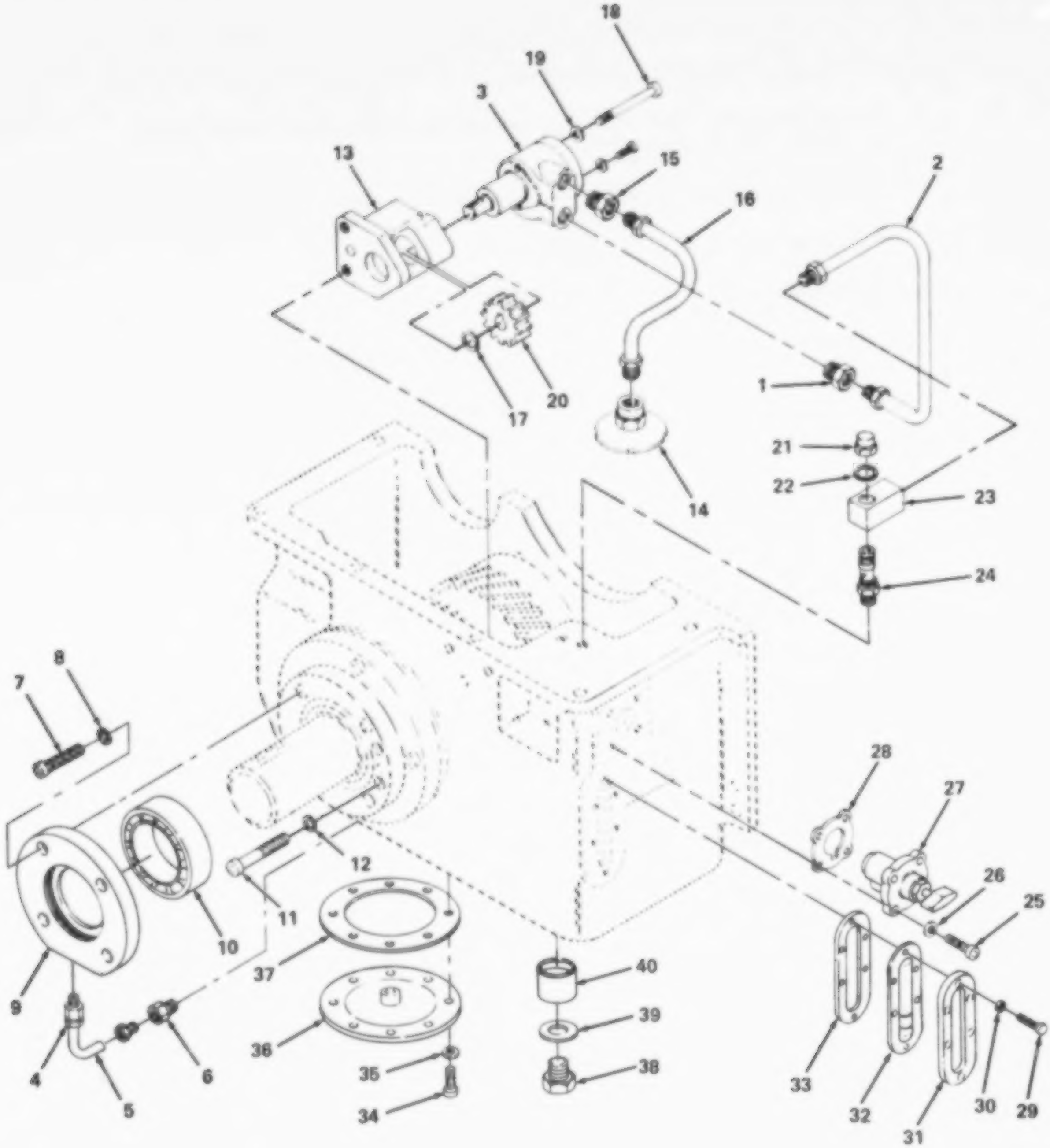
11 Remove four socket-head screws (25), washers (26), oil filter (27), and gasket (28).

12 Remove six round-head screws (29), washers (30), plate (31), oil level indicator (32), and gasket (33).

13 Remove eight screws (34), washers (35), cover plate (36), and gasket (37).

14 Remove plug (38), washer (39), and pipe (40).

15 Replace worn or damaged pinion gear (20) and binding or damaged lubrication pump (3). Replace clogged filter (27) and damaged oil level indicator (32). Replace leaking gasket (37) and damaged oil tubes (2, 5, 16). Replace clogged relief valve (21) and frozen or binding bearing (10). Replace missing or damaged suction screen (14).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4710-160(1/2)

Figure 2-209. Lubrication System Pump Disassembly.

2-77. Gear Box Assembly (cont).

(b) Pinion gear and drive shaft. (figure 2-210).

1 Remove four socket-head screws (1), washers (2), bearing flange (3), bearing (4), and lubrication pump locator pin (5).

2 Remove pinion and drive shaft assembly (6) through hole in casing (7).

3 Slide pinion gear (8) off drive shaft (6).

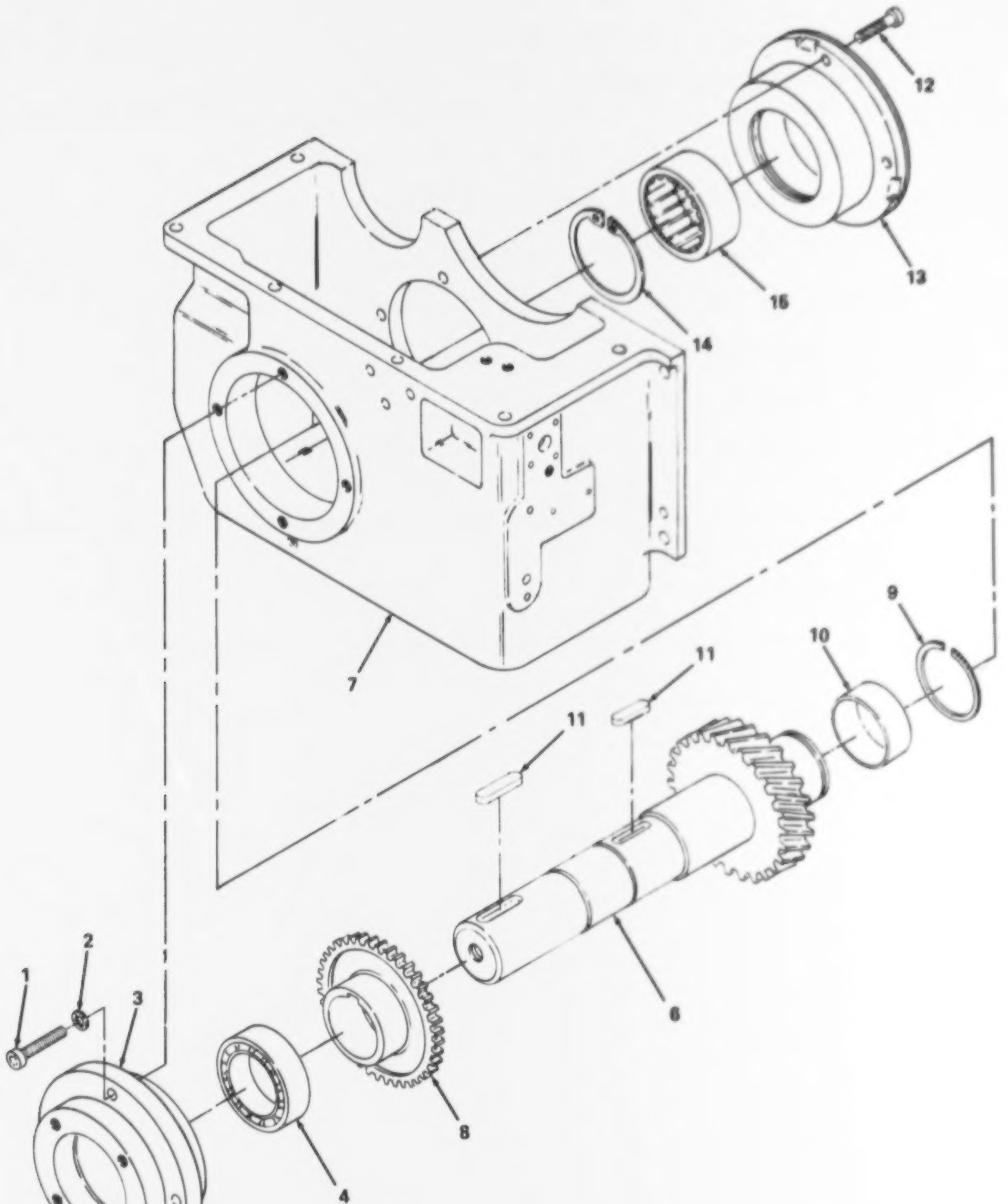
4 Remove retaining ring (9) and spacer (10).

5 Remove keys (11).

6 Remove four socket-head screws (12) and bushing flange (13).

7 Remove retaining ring (14) and bearing (15).

8 Replace binding or frozen bearings (4, 15). Replace worn or damaged pinion gear (8) or pinion gear that is part of shaft (6). Replace damaged casing (7).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4710-160(2/2)

Figure 2-210. Pinion Gear and Drive Shaft Assembly Disassembly.

2-77. Gear Box Assembly (cont).

(2) *Assembly.*

(a) *Pinion gear and drive shaft.* (figure 2-211).

1 Replace bearing (1) and retaining ring (2).

2 Replace bushing flange (3) and four socket-head screws (4) on casing (5).

3 Replace keys (6).

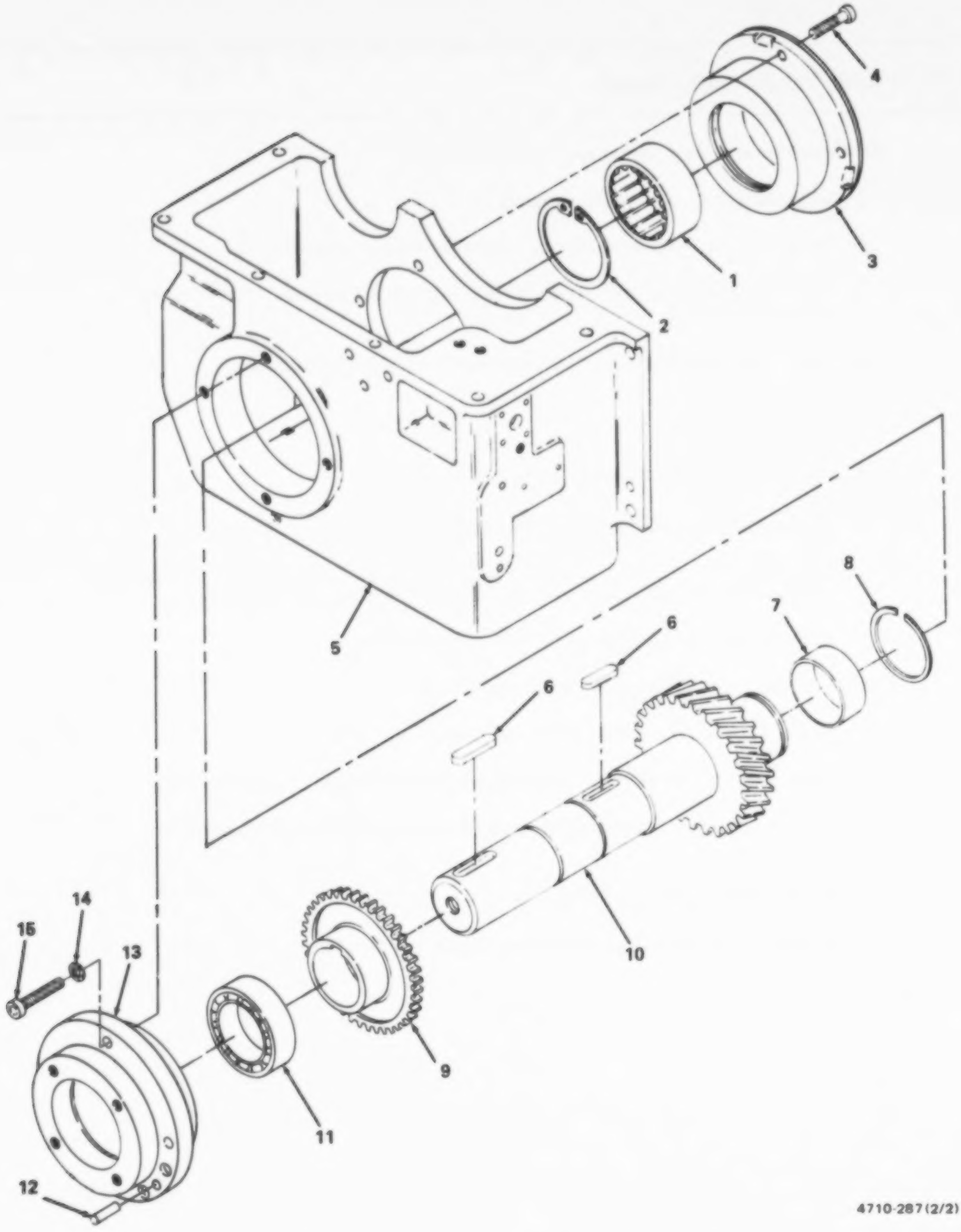
4 Replace spacer (7) and retaining ring (8).

5 Replace pinion gear (9) on shaft (10) and aline with, and slide gear onto, the key (6) closest to the shaft pinion gear.

6 Replace pinion and drive shaft assembly (10) through hole in casing (5) and seat end of shaft in bearing (1).

7 Replace bearing (11).

8 Replace locator pin (12), bearing flange (13), four washers (14), and socket-head screws (15).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4710-287(2/2)

Figure 2-211. Pinion Gear and Drive Shaft Assembly.

2-77. Gear Box Assembly (cont).

(b) Lubrication system pump assembly. (figure 2-212)

1 Replace pipe (1), washer (2), and plug (3).

2 Replace cover plate (4), gasket (5), eight washers (6), and screws (7).

3 Replace gasket (8), oil level indicator (9), plate (10), six washers (11), and roundhead screws (12).

4 Replace oil filter (13), gasket (14), four washers (15), and socket-head screws (16).

5 Replace fitting (17).

6 Replace oil tube (18) and connecting piece (19).

7 Replace relief valve (20) and packing ring (21).

8 Attaching bearing bracket (22) to lubrication pump (23) and replace pinion gear (24) and retaining ring (25) on pump shaft before fully seating shaft in bracket.

9 Replace two washers (26) and socket-head screws (27).

10 Seat retaining ring (25) in groove in pump shaft.

11 Replace suction screen (28), fitting (29), and oil tube (30).

12 Replace bearing bracket (22), two washers (31), and socket-head screws (32).

13 Replace bearing (33), bearing flange (34), four washers (35), and socket-head screws (36).

14 Replace oil tube (37) and fittings (38, 39).

15 Replace fitting (40) and oil tube (18) on lubrication pump (23).

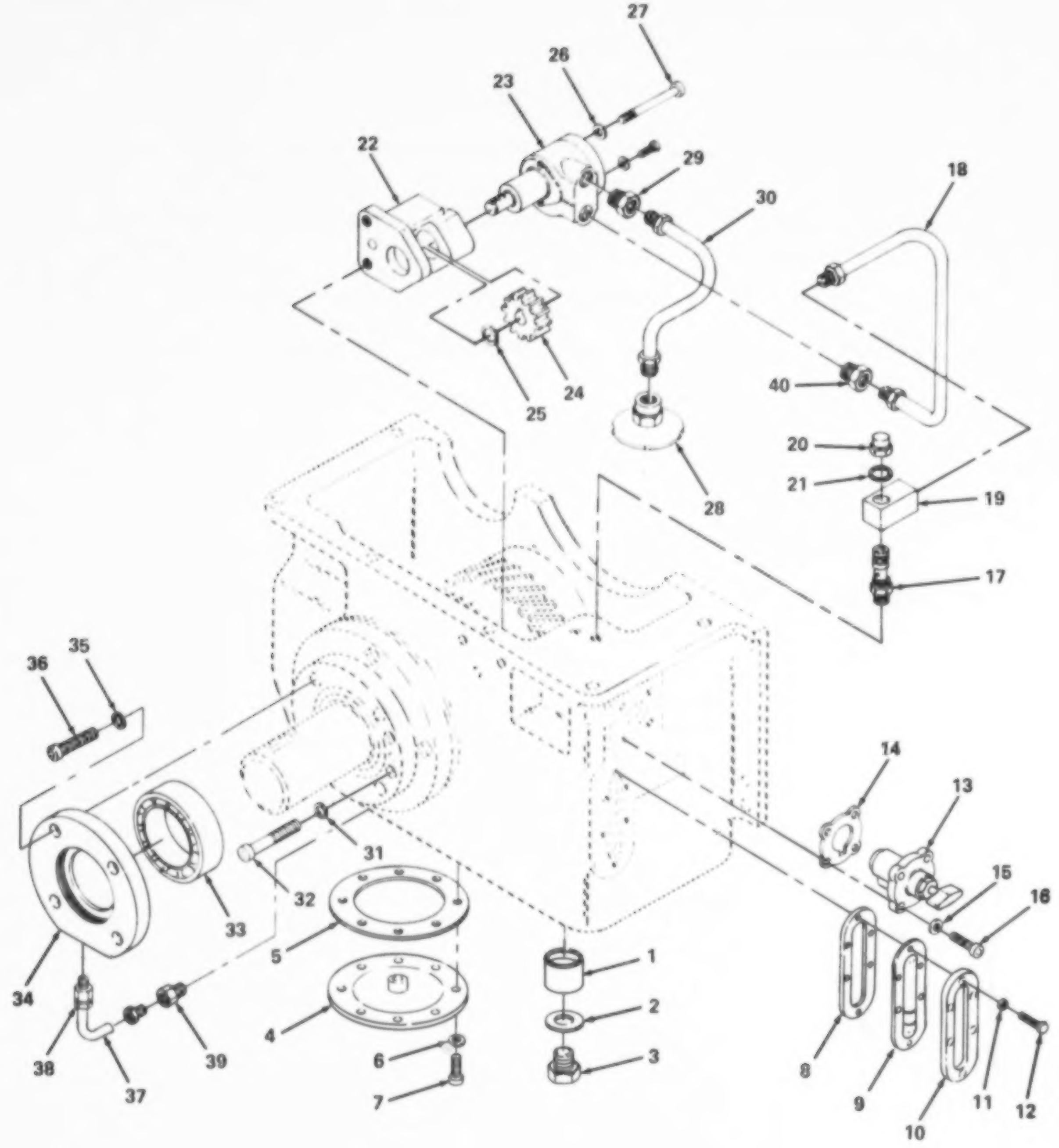
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Figure 2-212. Lubrication System Pump Assembly.

2-77. Gear Box Assembly (cont).

c. *Install.* (figure 2-213)

WARNING

Gear box (1) greatly exceeds 35 pounds. Use three persons to perform steps (1) and (2).

(1) Raise gear box (1) to aline locator pins (2) with holes in printing press, and support gear box (1) with wooden blocks.

(2) Install gear box (1), two locator pins (2), four washers (3), and hex-head screws (4).

(3) Install two socket-head screws (5) from behind press D/S frame into gear box (1).

(4) Remove wooden support blocks.

(5) Install three socket-head screws (6) and oil line (7).

NOTE

Pulley exceeds 35 pounds. Use two persons to perform step (6).

(6) Replace packing ring (8), V-belt pulley (9), threaded cover (10), and set screw (11).

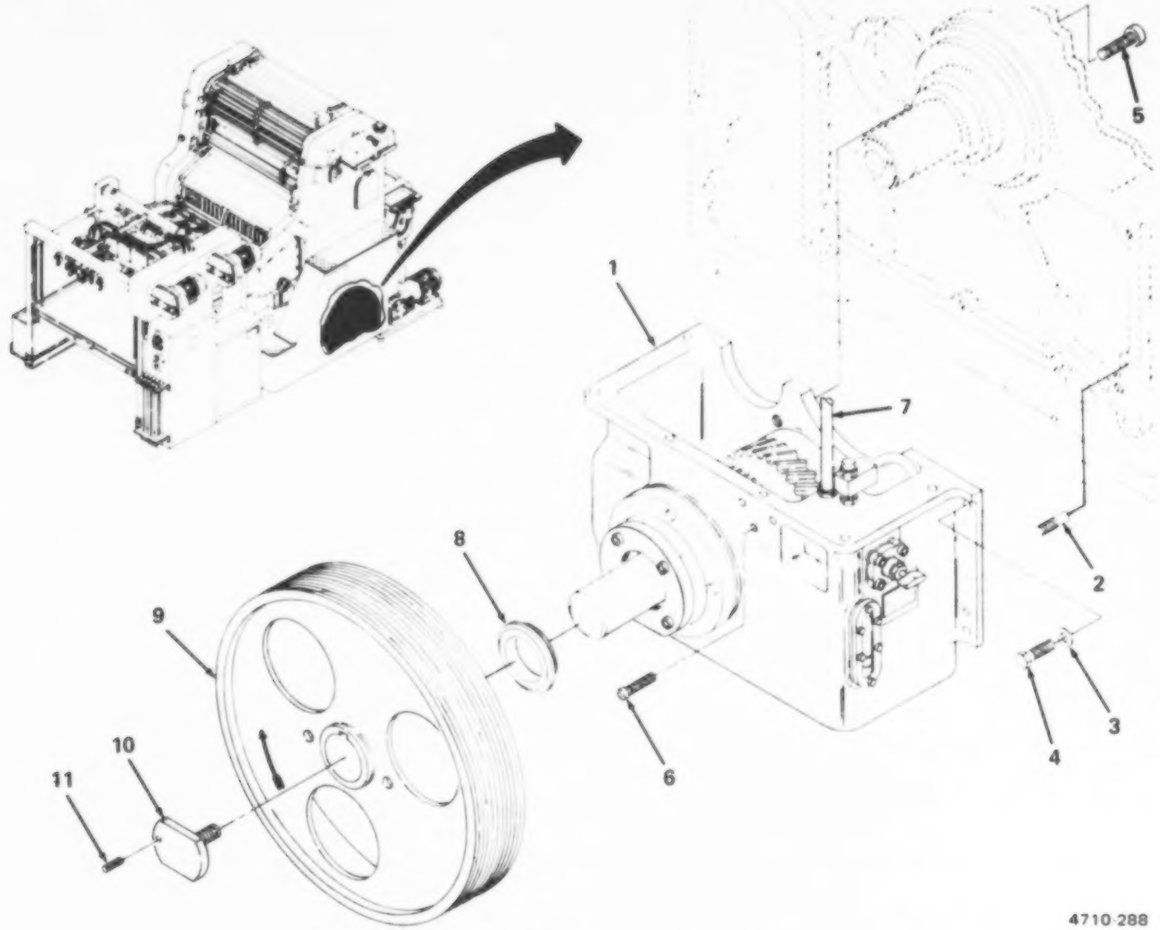
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Figure 2-213. Gear Box Assembly Installation.

NOTE

FOLLOW-ON MAINTENANCE:
(1) Fill casing with oil (LO 5-3610-286-12).
(2) Install V-belt (para. 2-80).
(3) Install belt guard (para. 2-17)
(4) Install main guard (D/S) (para. 2-20).

2-78. Lubrication Distribution System.

This task covers: a. Inspect b. Replace c. Repair

INITIAL SETUP

Tools

8 mm combination wrench
12 mm combination wrench
14 mm combination wrench
19 mm combination wrench
22 mm combination wrench
5 mm hex key

Equipment Conditions

Main guard (D/S) removed (para. 2-20)
Upper guard (O/S) removed (para. 2-18)
Lower guard (O/S) removed (para. 2-19)
Feeder guard removed (para. 2-90)

a. *Inspect.*

(1) The lubrication distribution system is made up of a pump, distribution units, and oil lines. The pump moves the oil from the reservoir and applies pressure to distribute the lubricant throughout the system. The distribution units provide branching of the oil lines and metering of the lubricant. The oil lines carry the oil to the precise locations requiring lubrication. The majority of the oil lines are fabricated from copper tubing. Where flexibility or reciprocating movement is required, nylon tubing is used. In either case, compression fittings are used to interconnect the lubrication distribution system.

(2) The figures (2-214 through 2-220) that accompany these inspection procedures illustrate the composition and location of the Lubrication Distribution System components. The individual parts have been exploded for clarity and to identify joints where leaks can occur.

(3) Visually inspect lubrication system, paying particular attention to the following items:

(a) Check copper and nylon oil lines for signs of cracks or chafing in tubing.

(b) Inspect compression fittings joining oil lines, manifolds, and metering devices for leaks.

(c) Observe areas targeted by lubrication system for signs of insufficient oiling and/or wear, indicating a blocked metering device or mis-aimed oil line.

(4) Lubrication oil is drawn up from the gear box by a manually actuated pump (figure 2-214) located on the D/S of the press. At the pump, some of the oil is directed through a lubrication distributor mounted directly behind the pump. The remaining oil is forced out the top of the pump through two lubrication oil lines.

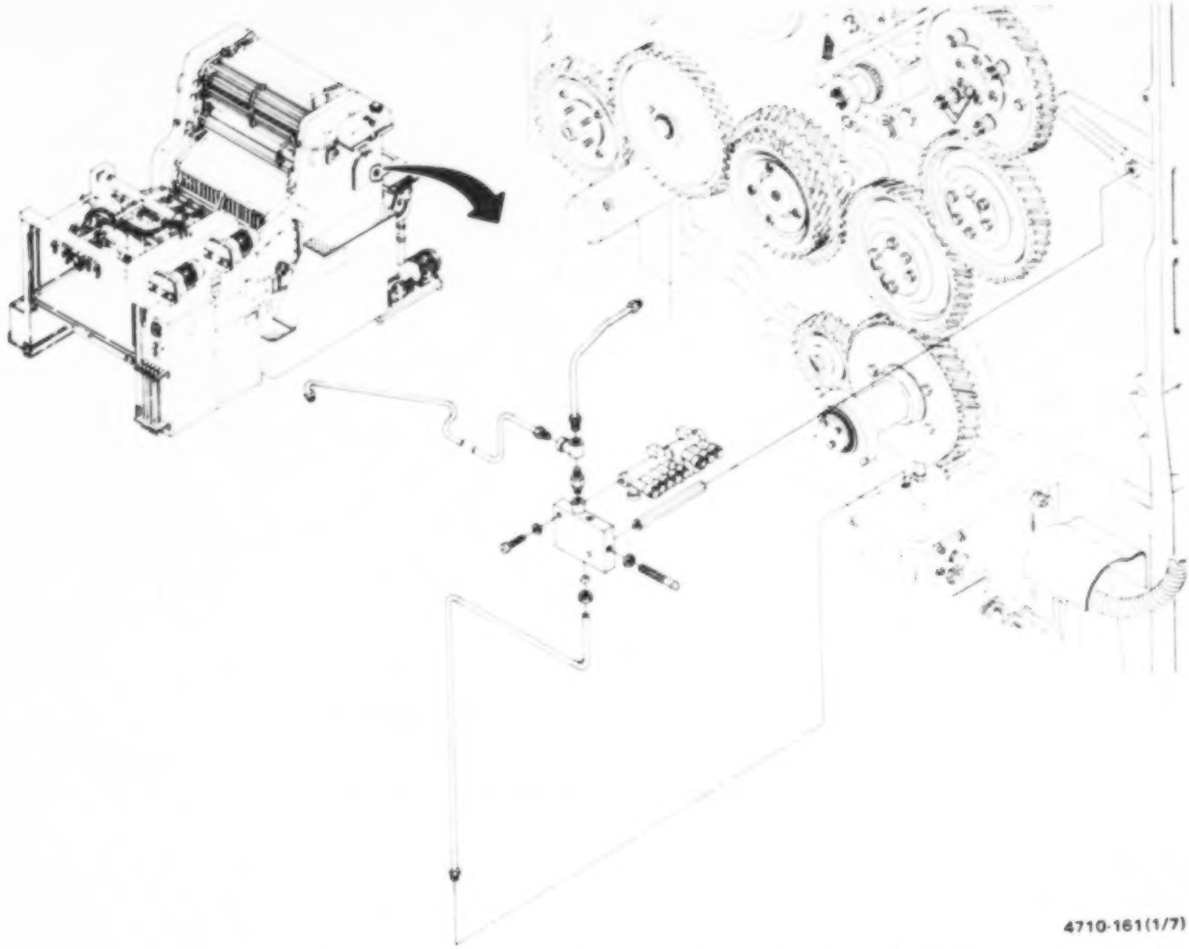


Figure 2-214. Lubrication Distribution System Manual Control Valve.

2-78. Lubrication Distribution System (cont).

(5) A tee fitting in one of the oil lines coming out of the pump connects to a laterally positioned oil line which feeds a distribution unit mounted above the feeder register gear train on the D/S of the press (figure 2-215). An oil line originating at this distribution unit supplies oil to a pair of distribution units mounted on the underside of the feeder register.

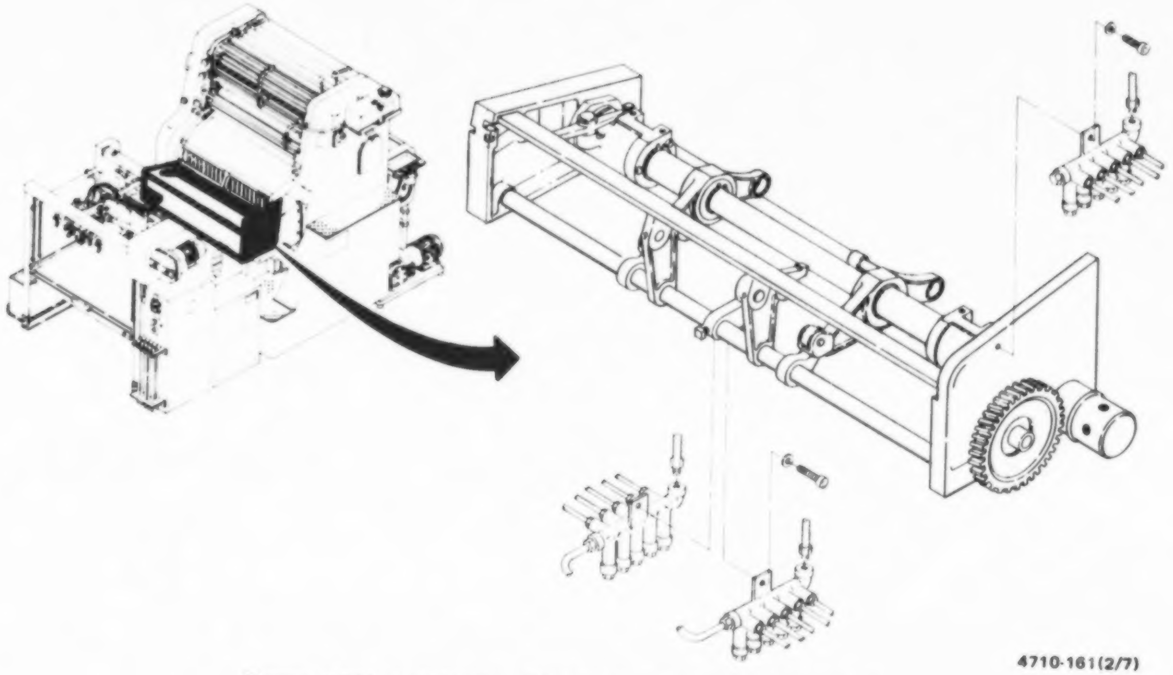


Figure 2-215. Lubrication Distribution System Feeder End.

(6) A distribution unit mounted on the D/S of the feeder itself (figure 2-216) is supplied with oil through an oil line originating at one of the two distribution units under the feeder register.

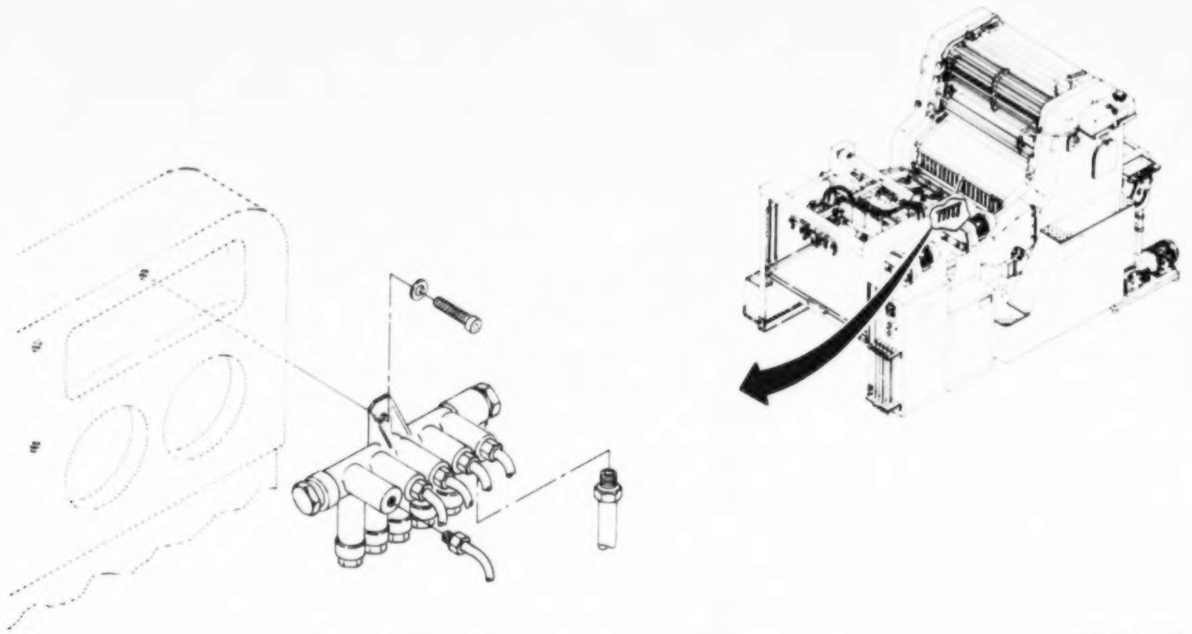
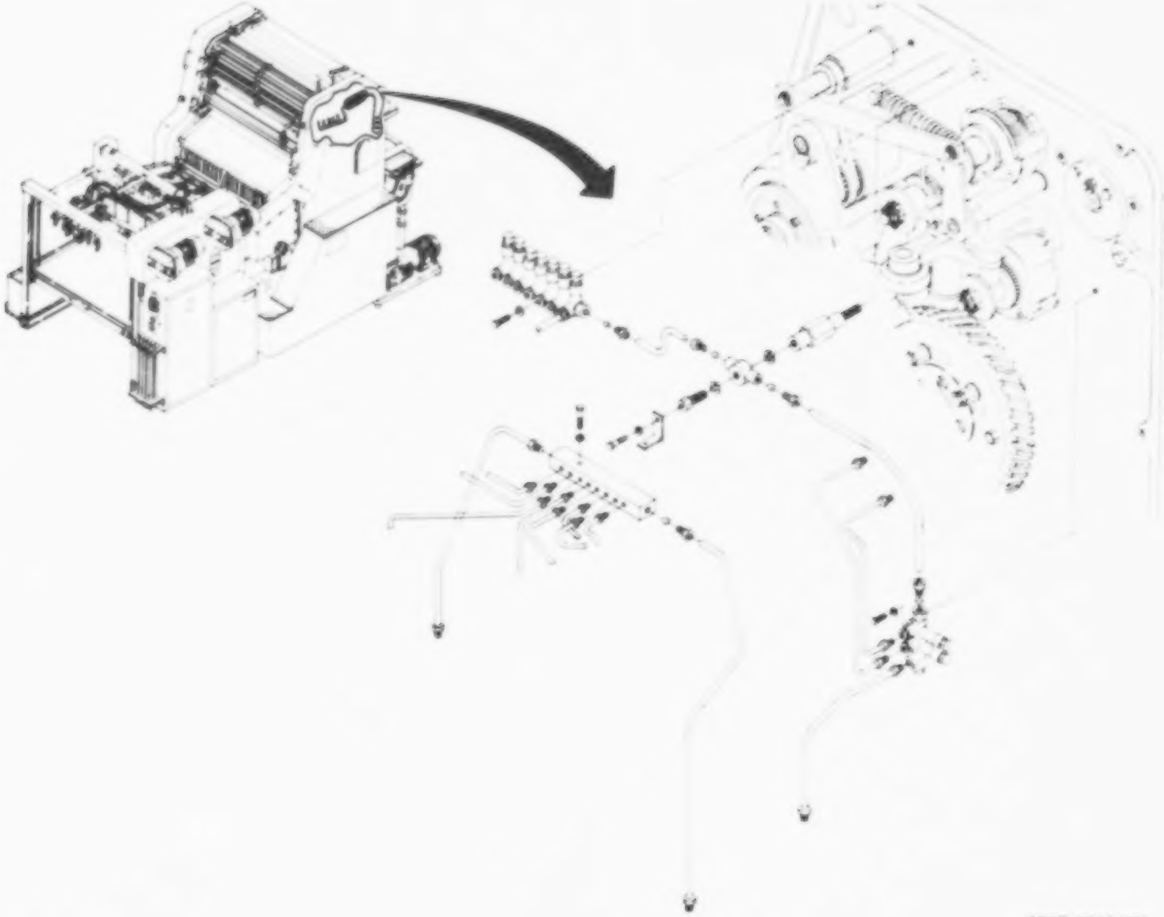


Figure 2-216. Lubrication Distribution System Feeder.

2-78. Lubrication Distribution System (cont).

(7) Oil, that is not diverted to the feeder end of the press by the tee fitting above the pump, continues upward on the D/S of the press. The two lubrication oil lines on top of the pump supply oil to three separate distribution units. The vertical oil line originating at the tee fitting supplies a manifold (figure 2-217) that feeds nine oil lines that direct oil to lubrication points on the D/S of the press.

(8) The second output line from the oil pump supplies oil to two distribution units that are interconnected through a hollow bolt. The lower distribution unit has three outputs on the exterior D/S of the press. The topmost distribution unit is supplied with oil through a copper oil line. This oil, in turn, is fed through the side of the press to internal lubrication points through five nylon oil lines.



4710-161(4/7)

Figure 2-217. Lubrication Distribution System Upper D/S.

2-78. Lubrication Distribution System (cont).

(9) The hollow bolt between the upper D/S distribution units goes through the side of the press into the manual inking roller shaft. An oil channel inside the shaft permits the oil to flow across to the O/S of the press where it exits the shaft through a similar hollow bolt (figure 2-118).

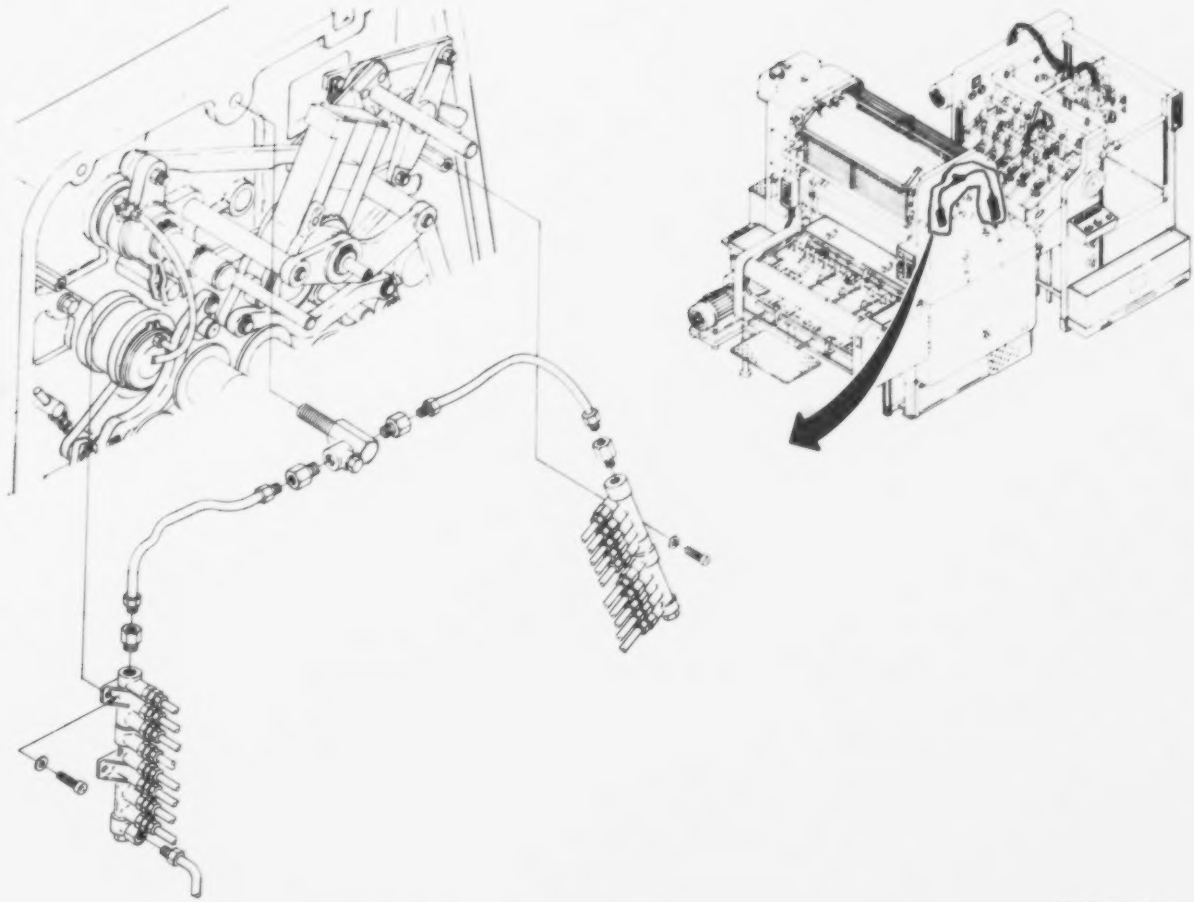


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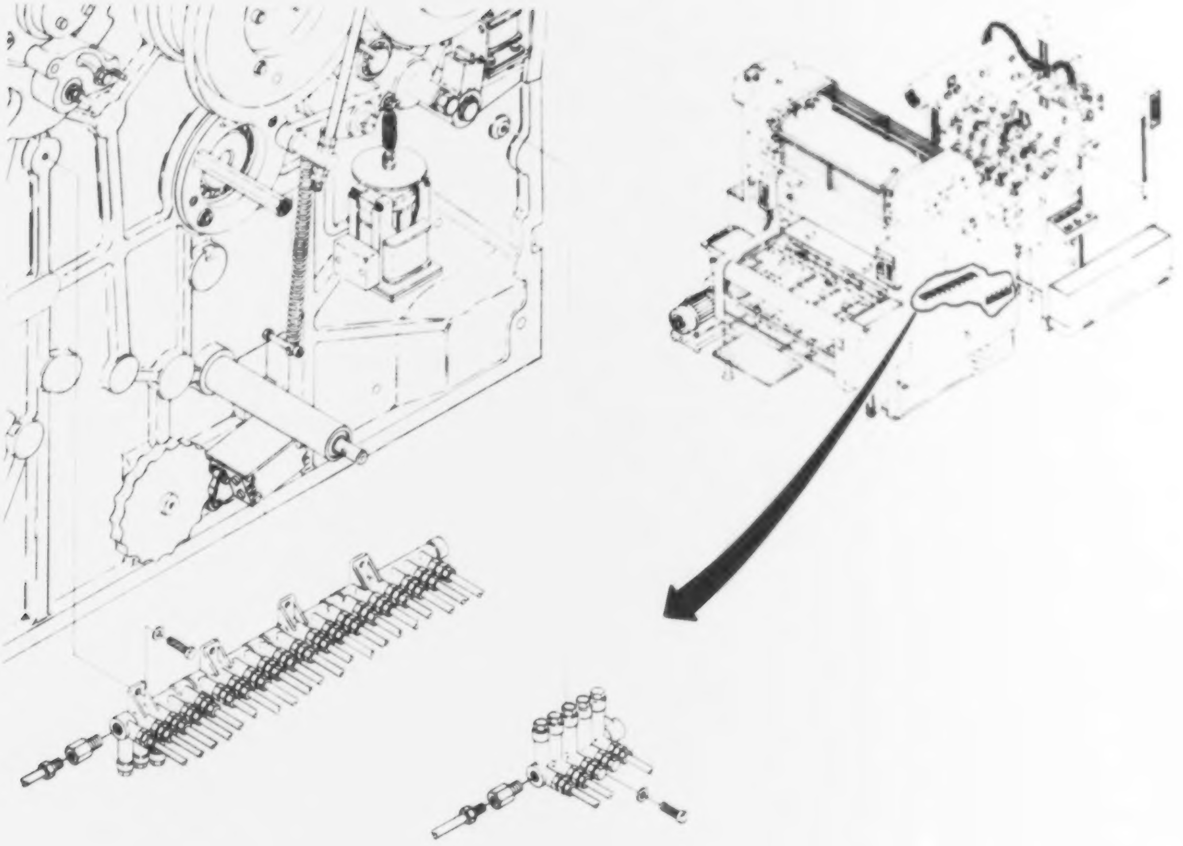
Figure 2-218. Lubrication Distribution System Upper O/S.

(10) From the manual inking roller shaft, the oil is fed in either direction to two distribution units mounted near the top of the O/S of the press. Each of these distribution units supplies a second unit mounted near the bottom of the press (figure 2-219). Together, these four distribution units provide lubrication of critical components on the O/S of the press.



4710-161(6/7)

Figure 2-219. Lubrication Distribution System Lower O/S.

2-78. Lubrication Distribution System (cont).

b. Replace. (figure 2-220)

NOTE

This replacement procedure is typical for all oil lines and distribution units in the lubrication distribution system.

(1) Loosen nut (1) and remove oil line (2).

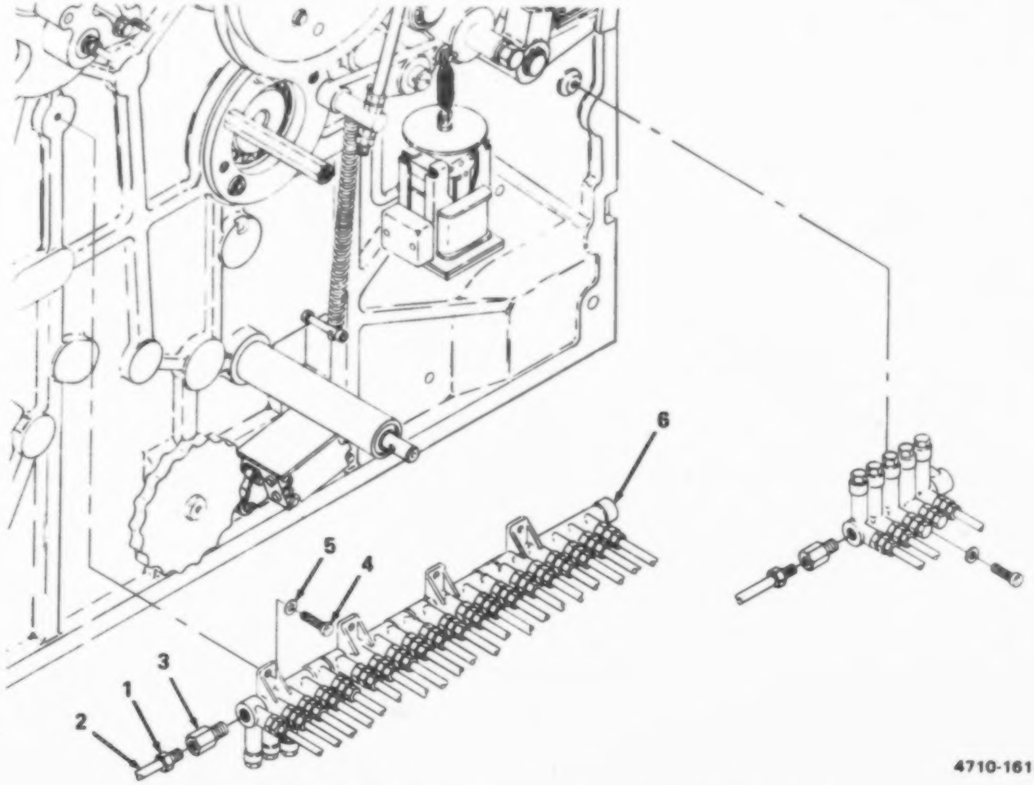
(2) Remove fitting (3).

(3) Remove screw (4), washer (5), and oil distribution unit (6).

(4) Position distribution unit (6) and replace washer (5) and screw (4).

(5) Replace fitting (3).

(6) Replace oil line (2) and tighten nut (1).



4710-161(7/7)

Figure 2-220. Lubrication Distribution System Replacement.

c. *Repair.*

(1) Replace leaking or damaged oil lines.

(2) Clean or replace clogged or damaged distribution units.

NOTE

FOLLOW-ON MAINTENANCE:
(1) Install feeder guard (para. 2-90).
(2) Install lower guard (O/S) (para. 2-19).
(3) Install upper guard (O/S) (para. 2-18).
(4) Install main guard (D/S) (para. 2-20).

2-79. Main Motor and Drive Assembly.

This task covers: a. Inspect b. Test c. Service d. Repair

INITIAL SETUP

Tools

5 mm hex key
8 mm combination wrench
24 mm combination wrench
0.050 x 0.375 x 8 in. flat-tip screwdriver

Equipment Conditions

Main control box panels removed (para. 2-93)

Equipment Conditions (cont)

Belt guard removed (para. 2-17)
V-belt removed (para. 2-80)
Gear box removed (para. 2-77)

Additional Personnel Requirement

Electrician MOS 35E20

a. *Inspect.*

WARNING

When working on high-voltage components, always have an additional person present, and keep one hand away from equipment to reduce hazard of current flowing through vital organs of body. Remove all jewelry from fingers, wrists, and neck prior to working on electrical components. Failure to do so may result in death or serious burns.

(1) Remove twelve hex-head screws and three motor cover panels.

NOTE

To view the top and bottom sets of brushes, it is necessary to position the commutator in a position that makes them accessible at the openings of the main motor. The main power switch and push button are located in main control box, (para. 2-93).

(2) With main power switch ON, push contactor button on relay contactor (c3).

(3) When commutator is expanded to position, turn main power switch OFF.

(4) Inspect commutator carbon brushes for movement in housing.

(5) Check wear of commutator carbon brushes. If upper edge of carbon brush is more than 0.20 in. (5.00 mm) below upper edge of brush holder, replace (see para. 2-80, d.).

(6) Inspect slip ring brushes for movement in holder and for wear. Replace carbon brushes when running edge is 0.08 in. to 0.12 in. (2.00 mm to 3.00 mm) from lower edge of holder (see para. 2-80, d.).

(7) Replace three motor cover panels and twelve hex-head screws.

b. *Test.*

(1) Operate motor, paying attention to any audible or visual indications of a malfunction that may be detected.

(2) Operate motor throughout entire speed range.

(3) Test operation of main motor brake release.

c. *Service.*

WARNING

COMPRESSED AIR. Compressed air used for blowing away chips, dirt, etc., must leave nozzle at less than 30 psi (207 kPa) to prevent personal injury. Be certain that nozzle is rated to provide a maximum of 30 psi (207 kPa). Be sure to wear safety goggles or lenses when using compressed air. Compressed air and particles moved by compressed air can cause damage to your eyes.

(1) Using compressed air, clean collector-side brush holders, tooth racks, and rack and brush segment rings.

(2) Collector surface must be free of grease or paste. Clean collector surface if required.

(3) Lubricate bearings (LO 5-3610-286-12).

2-79. Main Motor and Drive Assembly (cont).

d. Repair.

(1) *Main motor removal.* (figure 2-221)

WARNING

Hazardous electrical voltages exist within printing press. Do not connect or disconnect any electrical components while power is on. Death, serious electrical shock, or burns may result.

(a) Remove connector F (1).

(b) Remove four hex-head screws (2) and cover (3).

(c) Tag wires for identification.

(d) Remove terminal hex nuts (4), washers (5), and wires (6).

(e) Twist cable collar (7) to the right and remove cable (8).

(f) Remove four mounting bolts (9), four washers (10), and remove main motor (11).

(g) Replace main motor (11), four washers (10), and four mounting bolts (9).

(h) Replace cable (8) and tighten cable collar (7).

(i) Replace tagged wires (6), washers (5), and hex nuts (4).

(j) Replace cover (3) and four hex-head screws (2).

(k) Replace connector F (1).

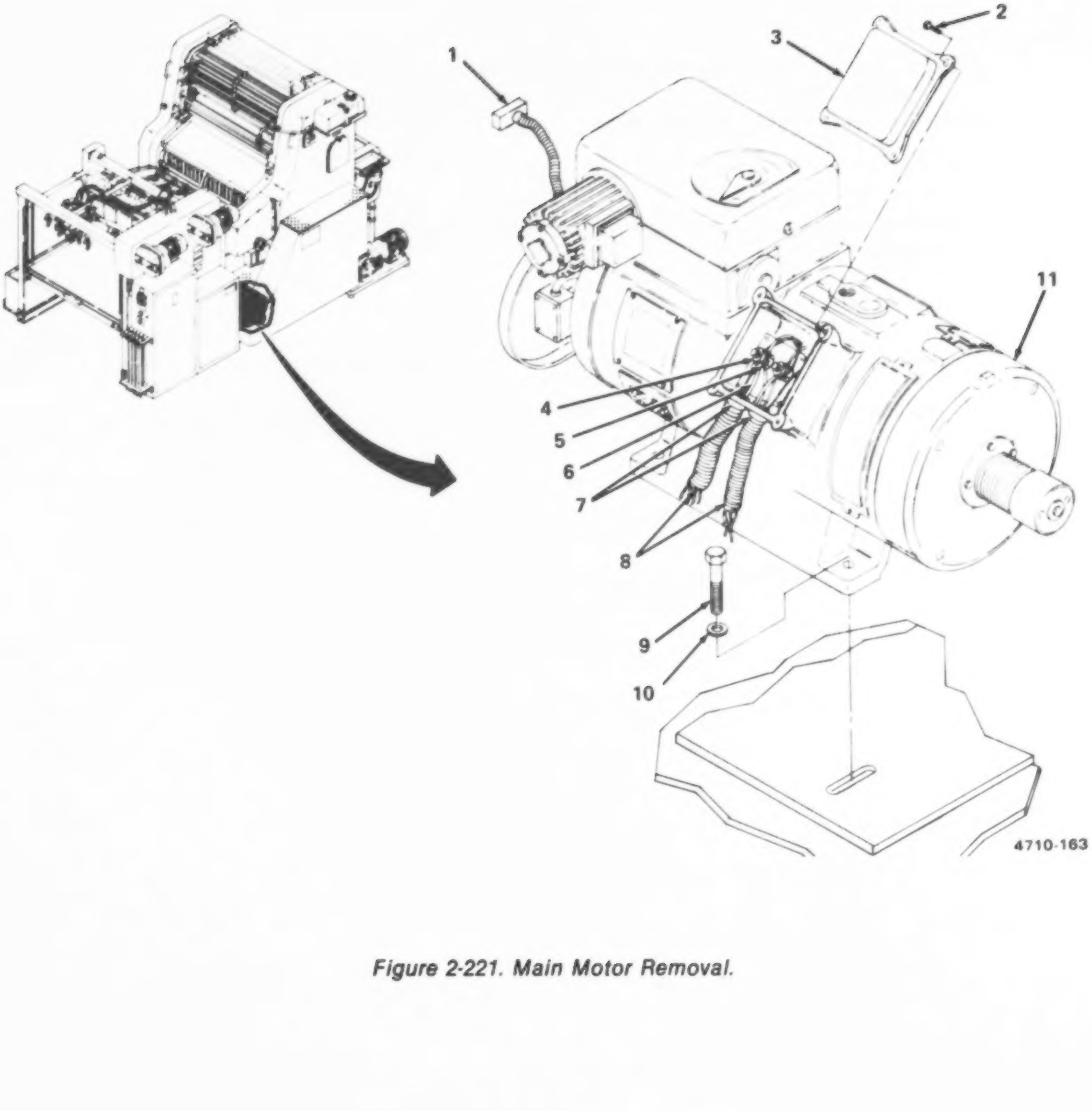

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Figure 2-221. Main Motor Removal.

2-79. Main Motor and Drive Assembly (cont).

(2) *Main motor brush removal.* (figure 2-222)

WARNING

Hazardous electrical voltages exist within printing press. Do not connect or disconnect any electrical components while power is on. Death, serious electrical shock, or burns may result.

NOTE

Refer to Inspection (para. 2-80, a.) to determine if wear on brushes exceeds acceptable limits.

(a) Commutator brush.

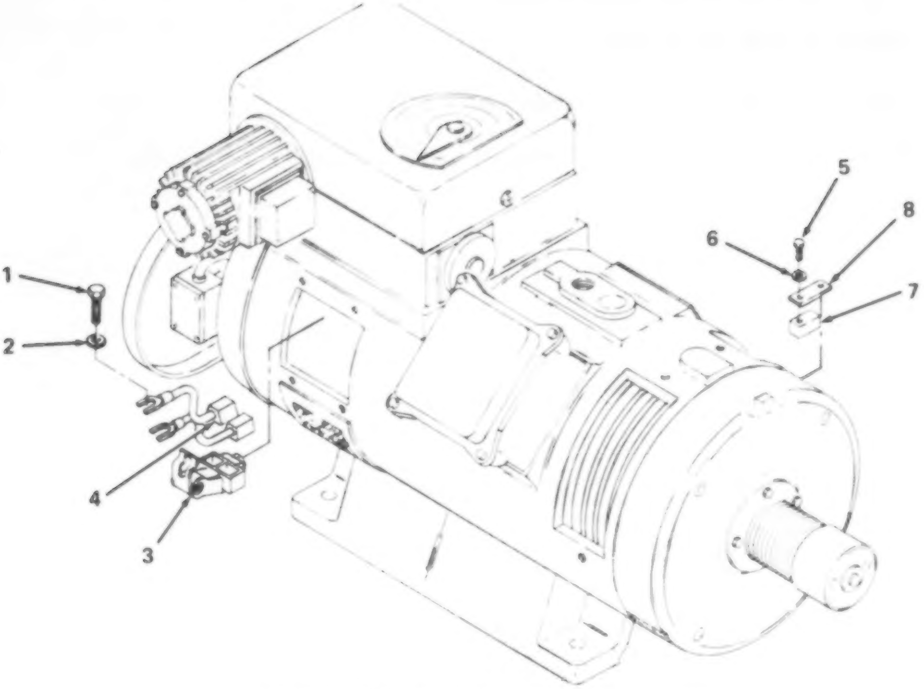
1 Remove screw (1) and lockwasher (2). Pull back retainer (3) and remove brush (4).

2 Pull back retainer (3), insert brush (4), and replace screw (1) and lockwasher (2).

(b) Slip ring brush.

1 Remove screw (5), lockwasher (6), and brush (7) from holder (8).

2 Position brush (7) on holder (8) and replace lockwasher (6) and screw (5).



4710-165

Figure 2-222. Main Motor Brush Removal.

2-79. Main Motor and Drive Assembly (cont).

(3) *Drive gear assembly repair.* (figure 2-223).

(a) Remove bearing housing (1).

(b) Remove ball bearing (2) from bearing housing (1).

(c) Remove three screws (3), flat washers (4), and cover plate (5).

(d) Remove retaining spacer (6).

(e) Remove six screws (7), flat washers (8), and gear (9).

(f) Remove tapered pin (10) from gear (9).

(g) Replace worn or damaged gear.

(h) Replace frozen or damaged ball bearing.

(i) Replace tapered pin (10) in gear (9).

(j) Replace gear (9) and aline tapered pin (10) with hole in hub (11).

(k) Replace six screws (7) and flat washers (8).

(l) Replace retaining spacer (6).

(m) Position cover plate (5) and replace three screws (3) and flat washers (4).

(n) Replace ball bearing (2) in bearing housing (1).

(o) Replace bearing housing (1).

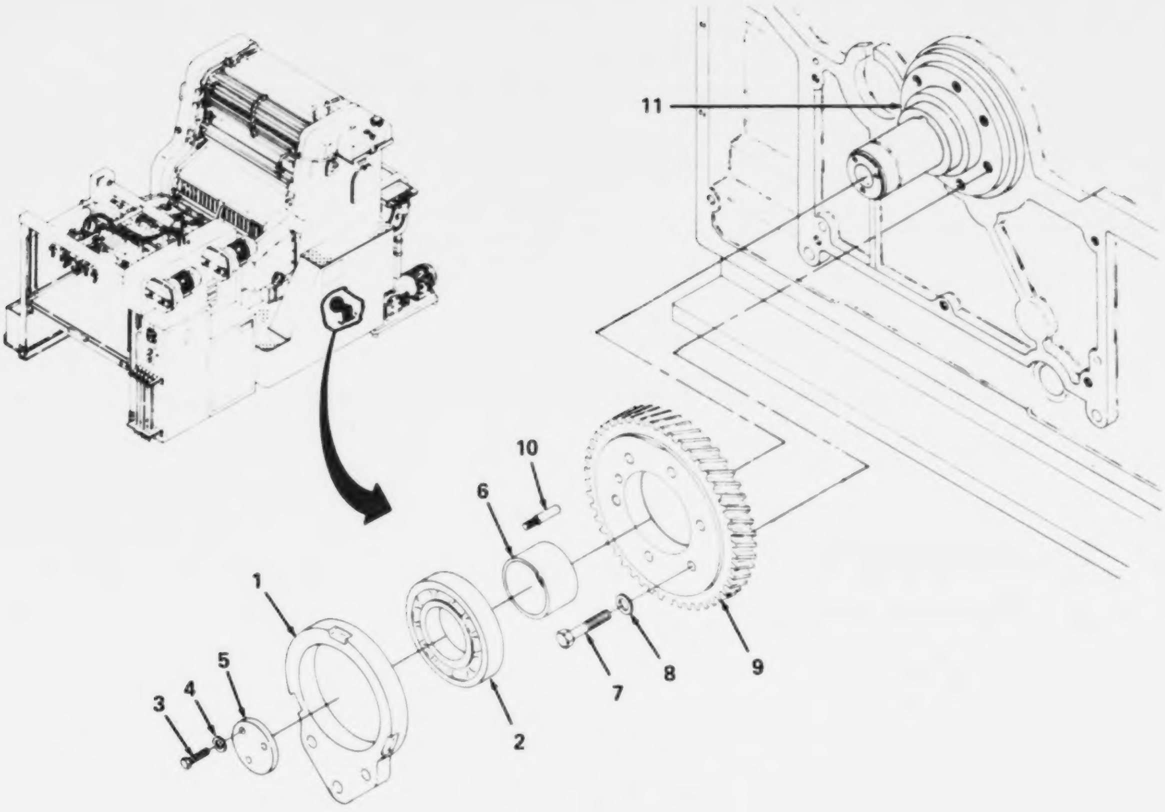


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Figure 2-223. Drive Gear Assembly Repair.

NOTE

FOLLOW-ON MAINTENANCE:
(1) Install gear box (para. 2-77).
(2) Install V-belt (para. 2-80).
(3) Install belt guard (para. 2-17).
(4) Install main control box panels (para. 2-93).

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2-80. V-Belt.

This task covers: a. Replace b. Adjust

INITIAL SETUP

Tools	*Equipment Conditions*
19 mm combination wrench 24 mm combination wrench Machinist's rule	Belt guard removed (para. 2-17)

a. Replace. (figure 2-224).

(1) Loosen nut (1) and tension adjusting screw (2).

(2) Loosen four motor mounting bolts (3) and slide motor (4) toward flywheel (5).

(3) Remove V-belt (6) from drive pulley (7) and flywheel (5).

(4) Replace V-belt (6) on drive pulley (7) and flywheel (5).

(5) Slide motor (4) away from flywheel (5) and tighten four motor mounting bolts (3).

(6) Adjust belt tension (para b.).

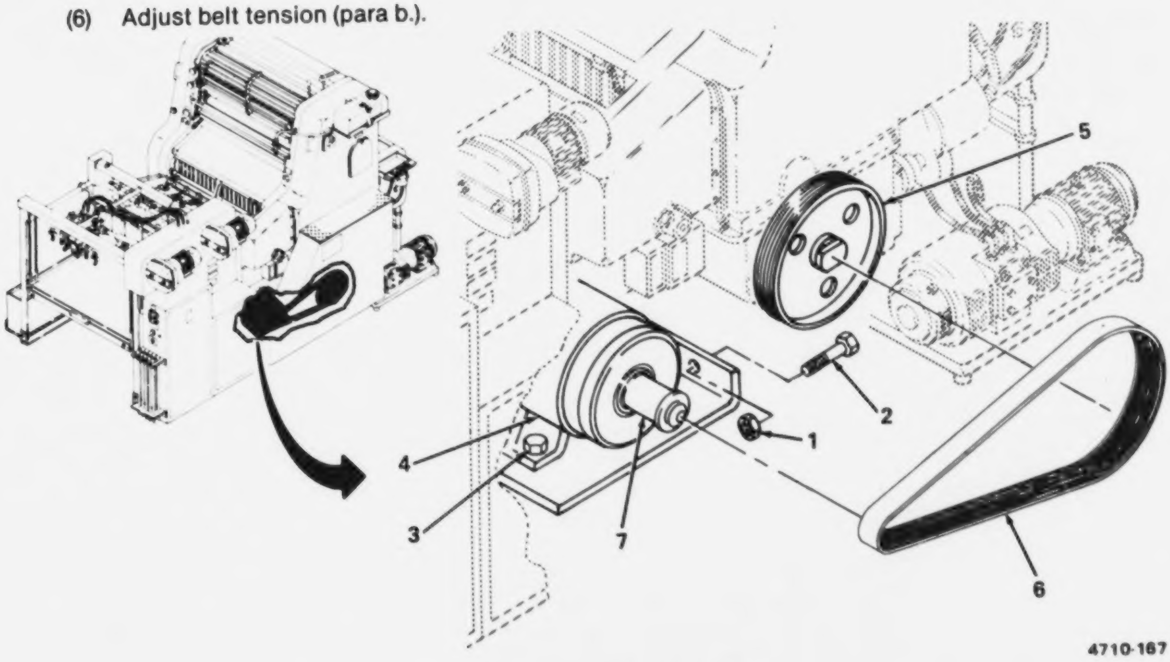


Figure 2-224. V-Belt Replacement.

b. *Adjust.* (figure 2-225)

(1) Loosen motor mounting bolts.

(2) Place a straight edge of a least two feet in length against the motor pulley and the flywheel to assure that the belt is perfectly alined.

(3) Adjust belt tension using tension adjusting screws until pressing down on the belt will deflect it no more than 1/4 inch (5 mm).

(4) Tighten motor mounting and tension adjusting bolts.

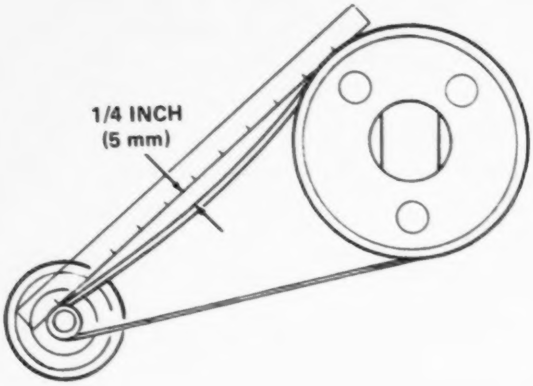


Figure 2-225. V-Belt Adjustment.

NOTE

FOLLOW-ON MAINTENANCE:
Install belt guard (para. 2-17).

2-81. Transfer Drum.

This task covers: a. Remove b. Inspect c. Repair d. Install

INITIAL SETUP

Tools

6 mm hex key
8 mm hex key
2 mm pin punch
10 mm combination wrench
0.50 in. flat-tip screwdriver
Ball-peen hammer

Equipment Condition

Press in "O" set position
Delivery guard open (TM 5-3610-286-10)

---

a. Remove. (figure 2-226)

(1) Push each rod (1) toward spring (2) and remove rods.

(2) Remove spring tension pin (3) and spring (2) from each rod (1).

(3) Remove star wheels (4) and supporting discs (5).

(4) Mark position of quadrants on shaft so that gripper bar will move in gap.

(5) Remove two socket-head screws (6) from each quadrant (7) and separate and remove three quadrants.

(6) Remove two socket-head screws (8) from each support bracket (9) and remove two support brackets and square bar (10).

(7) Remove two set screws (11) and slide four strap guides (12) off square bar (10).

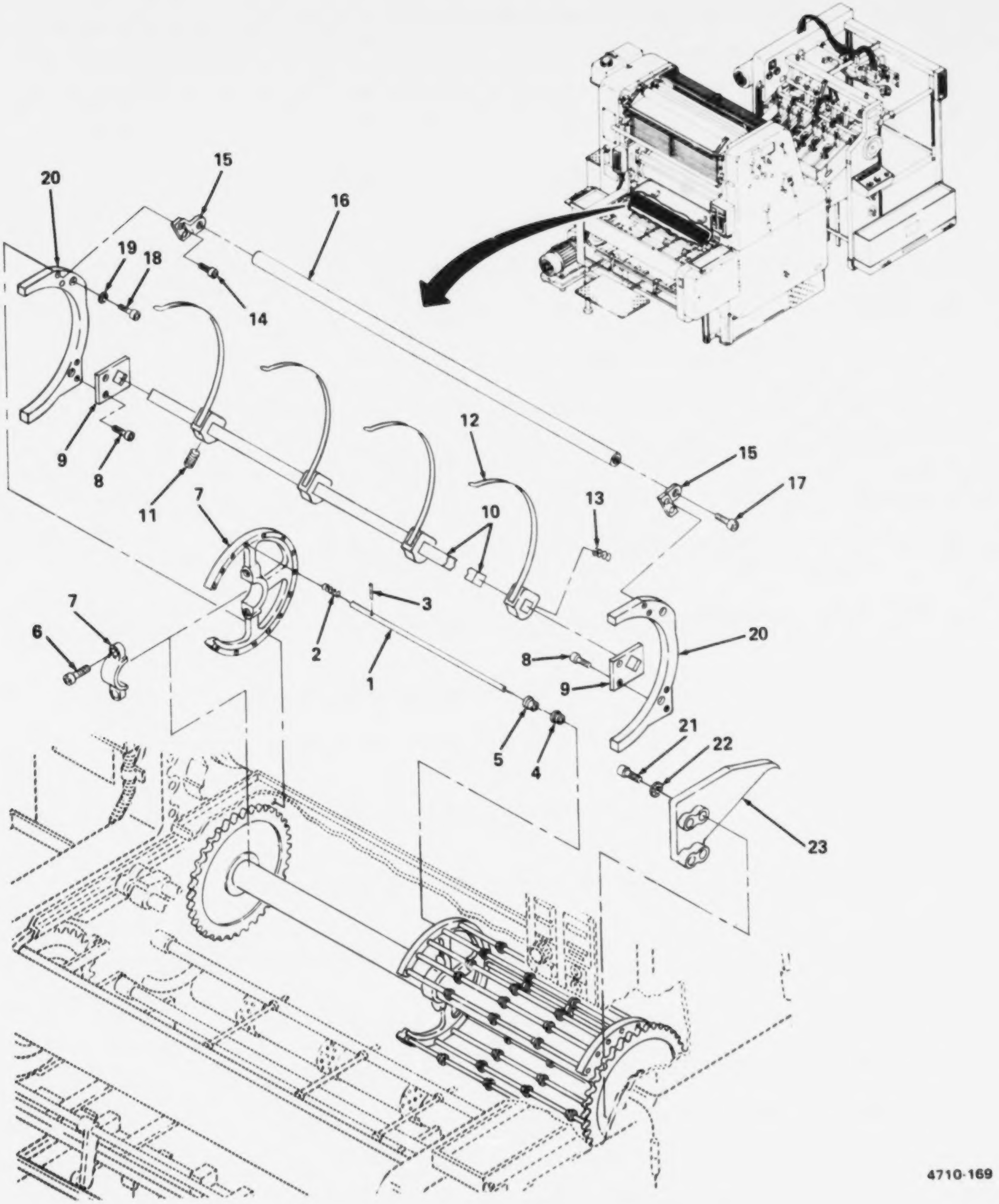
(8) Remove spring (13) from each strap guide (12).

(9) Remove two socket-head screws (14) from each bracket (15) and remove two brackets and bar (16).

(10) Remove two socket-head screws (17) and remove brackets (15) from bar (16).

(11) Remove two socket-head screws (18) and ribbed washers (19) from each chain guide (20) and remove two chain guides.

(12) Remove four socket-head screws (21) and ribbed washers (22) and remove cam gripper (23)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21
22
23
4710-169

Figure 2-226. Transfer Drum Removal.

2-81. Transfer Drum (cont).

b. *Inspect.*

(1) Make certain all star wheels and support discs are accounted for.

(2) Inspect for broken springs or bent rods.

(3) Inspect strap guides for damage or missing set screws.

c. *Repair.*

(1) Replace weak or broken springs.

(2) Replace bent or damaged strap guides.

(3) Replace worn star wheels and supporting discs.

d. *Install.* (figure 2-227)

(1) Position cam gripper (1) on press and install four ribbed washers (2) and four socket-head screws (3).

(2) Position each chain guide (4) on press and install two ribbed washers (5) and two socket-head screws (6) in each.

(3) Position two brackets (7) on bar (8) and install two socket-head screws (9).

(4) Install two socket-head screws (10) in each bracket (7) and install brackets with bar (8) on chain guides (4).

(5) Slide four strap guides (11) on square bar (12) and install one spring (13) and one set screw (14) in each guide.

(6) Position square bar (12) and two support brackets (15) in press and install two socket-head screws (16) in each bracket.

(7) Aline halves of quadrants (17) on shaft with marks made during removal, and install two socket-head screws (18) in each quadrant.

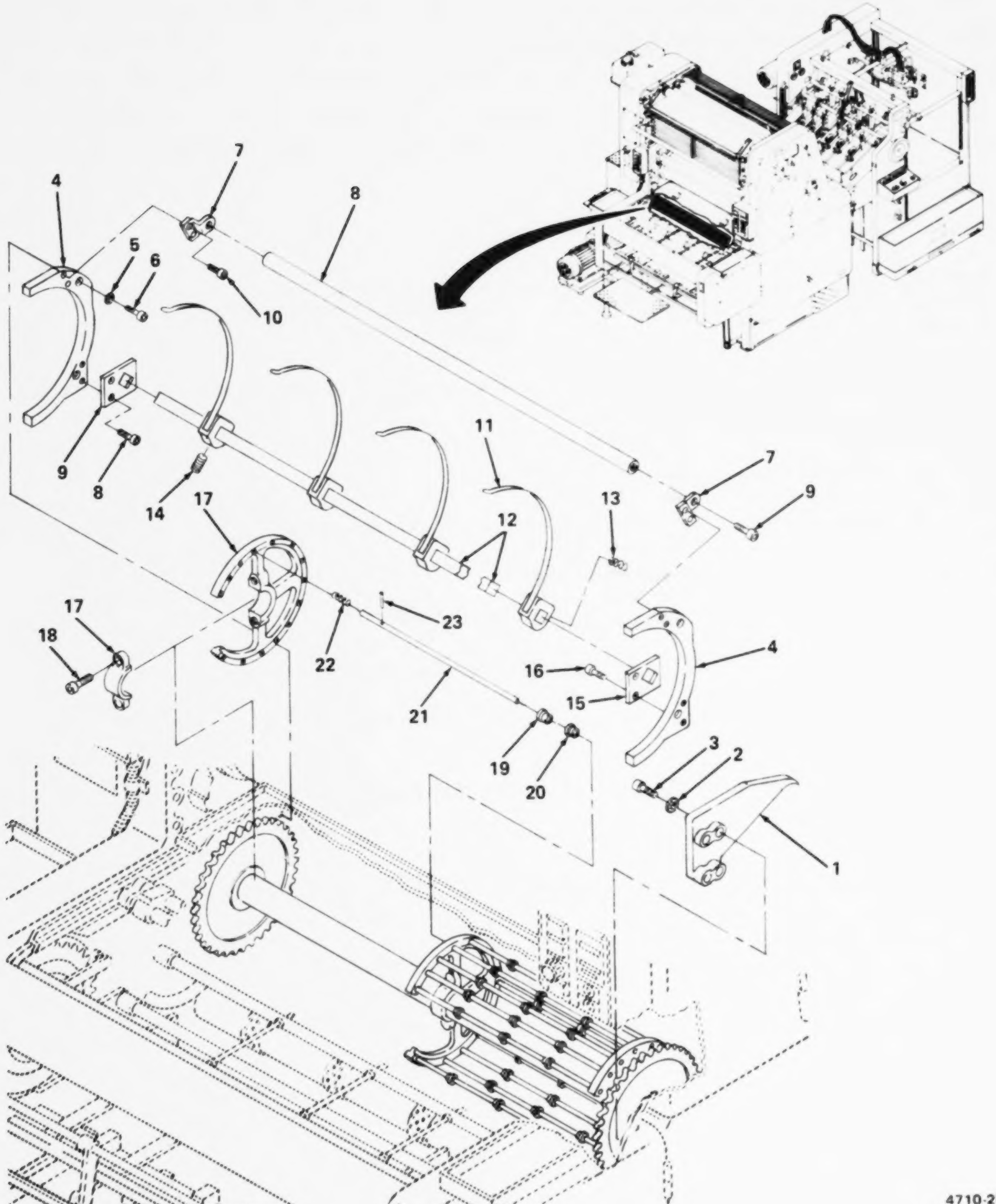
(8) Install support discs (19) and star wheels (20) on each rod (21).

(9) Position spring (22) on each rod (21) and install spring tension pin (23).

(10) Install each rod (21) in associated quadrants (17).

NOTE

FOLLOW-ON MAINTENANCE:
Close delivery guard (TM 5-3610-286-10).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1
4710-251

Figure 2-227. Transfer Drum Installation

2-82. Sheet Smoother and Accessories.

This task covers: a. Remove b. Repair c. Install

INITIAL SETUP

Tools

3 mm pin punch
4 mm pin punch
5 mm hex key
10 mm combination wrench

Tools (cont)

8-inch brass drift
1.0 x 6.0 x 0.5 mm flat-tip screwdriver
Ball-peen hammer

a. *Remove*. (figure 2-228)

(1) Remove six sheet guides (1).

(2) Remove two socket-head screws (2), washers (3), and safety guard (4).

(3) Remove four screws (5) and two holders (6).

(4) Remove spring pin (7) and collar (8).

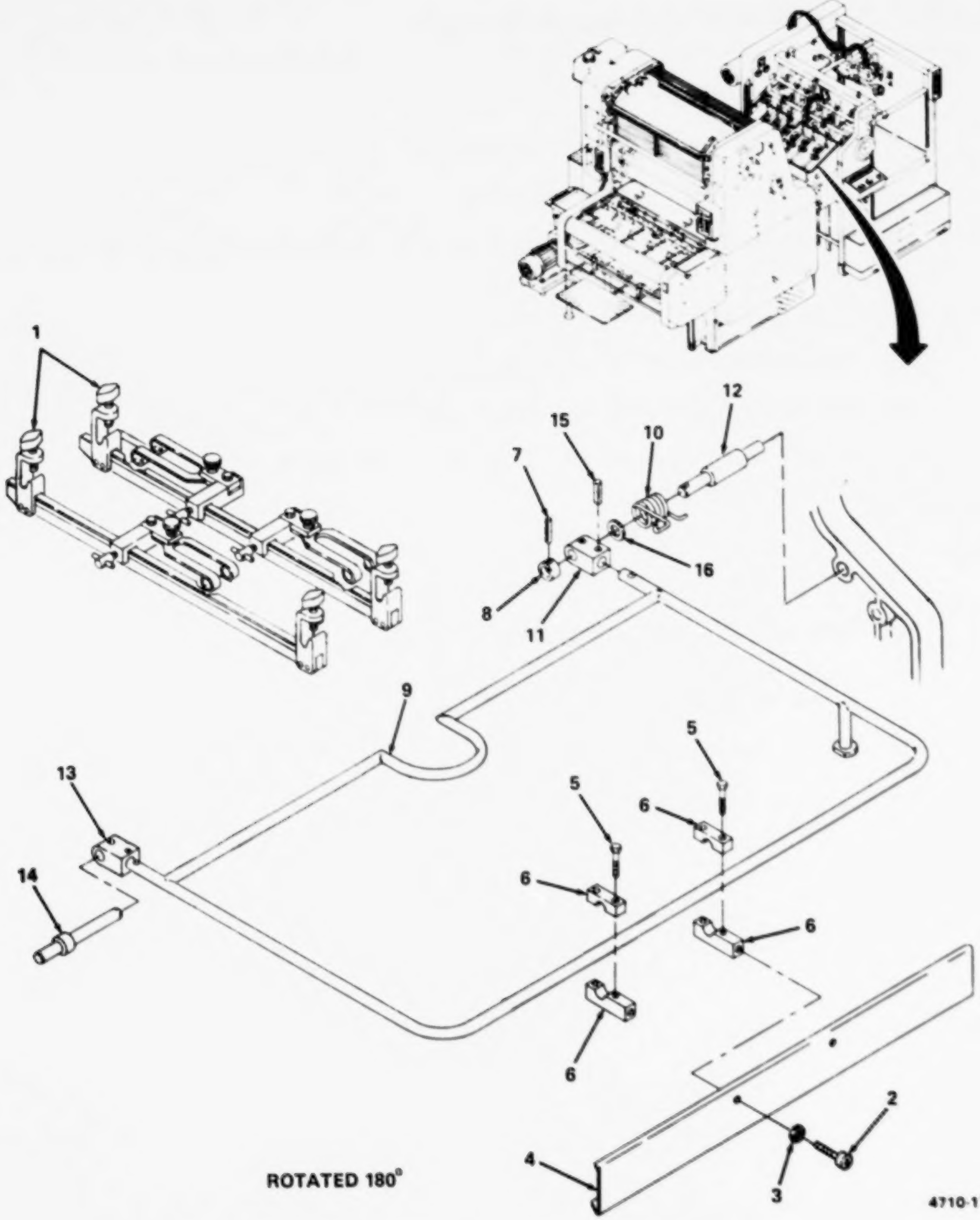
(5) Raise sheet smoother (9) to the upright position to relieve spring tension.

(6) Release spring (10), and slide end of sheet smoother (9) towards D/S until pivot head (11) is clear of shaft (12).

(7) Slide sheet smoother (9) toward O/S until D/S pivot head (13) is clear of shaft (14).

(8) Remove two pins (15) and pivot heads (11, 13).

(9) Remove washer (16), spring (10), and shafts (12) and (14).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3
ROTATED 180°
4710-171

Figure 2-228. Sheet Smoother and Accessories Removal.

2-82. Sheet Smoother and Accessories (cont).

b. *Repair.* (figure 2-229)

(1) Remove four spring pins (1), and two clamps (2).

(2) Remove tommy screws (3) from clamps (2).

(3) Remove knurled screw (4), spring (5), hex screw (6), bar (7), and guide plate (8) or caged ball assembly (9).

(4) Remove two slotted screws (10) and caged balls (11).

(5) Remove C-clip (12), pin (13), and rollers (14) or brushes (15).

(6) Remove clamp (16) and tommy screw (17).

(7) Replace items that are bent, broken, cracked, or show signs of distortion or excessive wear.

(8) Replace clamp (16) and tommy screw (17).

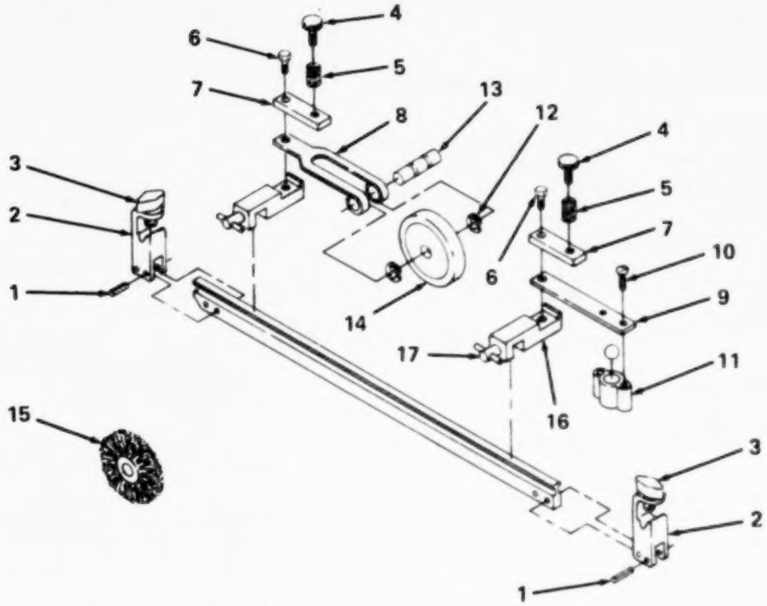
(9) Aline brushes (15) or rollers (14), and install pin (13) and C-clip (12).

(10) Replace caged balls (11) and two slotted screws (10).

(11) Install guide plate (8) or caged ball assembly (9), bar (7), hex screw (6), spring (5), and knurled screw (4).

(12) Replace tommy screw (3) in clamp (2).

(13) Install two clamps (2) and spring pins (1).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3
2
1

4710-172

Figure 2-229. Sheet Smoother Repair.

2-82. Sheet Smoother and Accessories (cont).

c. *Install.* (figure 2-230)

(1) Install shafts (1) and (2), spring (3), and washer (4).

(2) Install pivot heads (5, 6) on shafts (1, 2) and install pins (7).

(3) Insert end of sheet smoother (8) into pivot head (6).

(4) With sheet smoother (7) in the upright position, position hooked end of torsion spring (3) under sheet smoother. Straight end of spring (3) engages feeder frame.

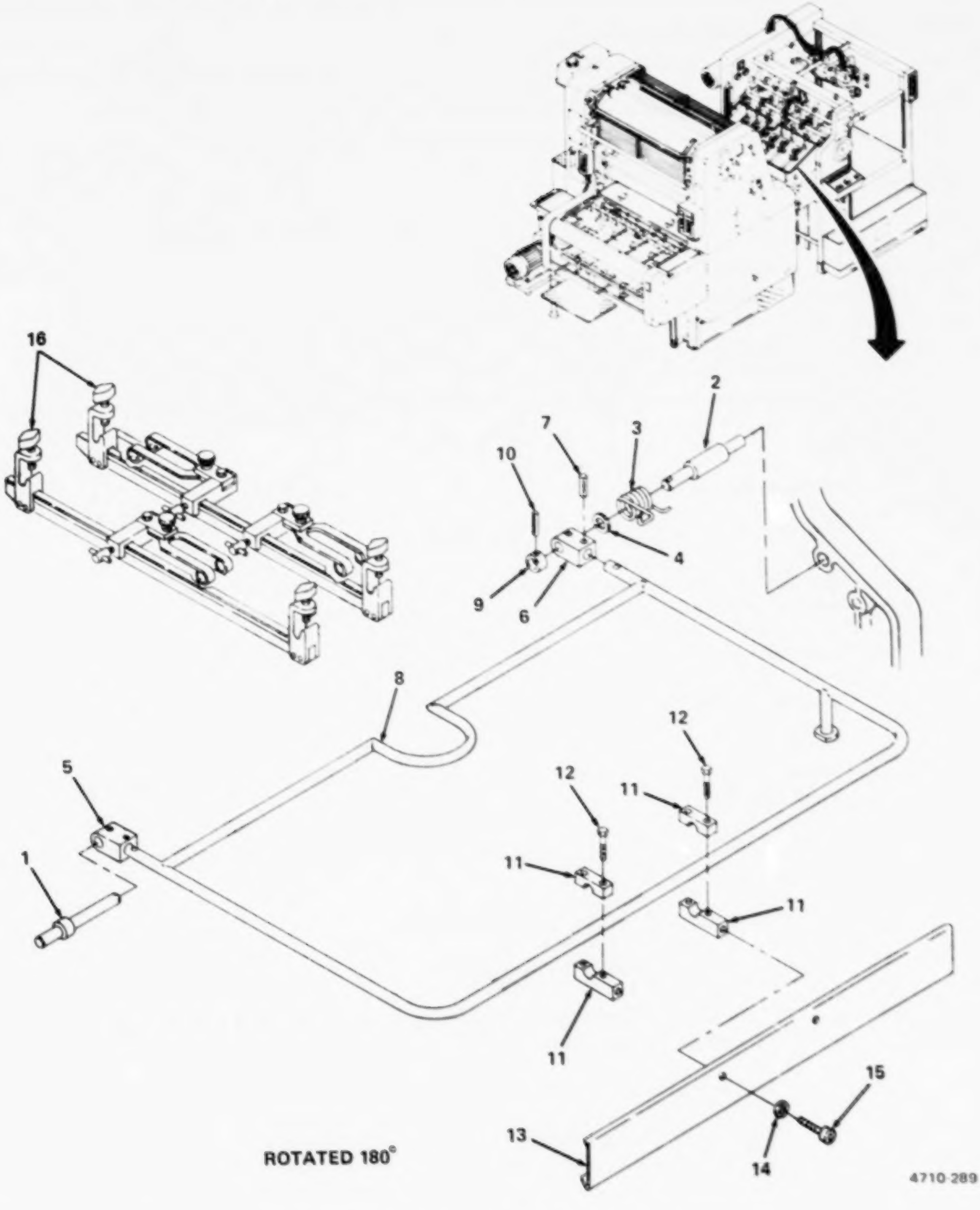
(5) Lower sheet smoother (8) to operating position, and lock in place.

(6) Install collar (9) and spring pin (10).

(7) Mount holders (11) and screws (12) on sheet smoother (8). Do not tighten screws.

(8) Aline and center safety guard (13) and holders (11). Install washers (14) and screws (15). Tighten screws (12).

(9) Install six sheet guides (16).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13
14
ROTATED 180°
4710-289

Figure 2-230. Sheet Smoother and Accessories Installation.

2-83. Static Bar Assembly.

This task covers: a. Replace b. Repair

INITIAL SETUP

Tools	*Additional Personnel Requirement*
0.046 x 0.3125 x 6 in. flat-tip screwdriver No. 3 x 6 in. cross-tip screwdriver 10 mm combination wrench 13 mm combination wrench Wrench (tool no. 66.024.016)	Electrician MOS 35E20

a. *Replace.*

(1) *Power box.* (figure 2-231)

WARNING

Shut off power source before attempting to disconnect, service, or connect wires or cables. Failure to do so may result in death or serious injury.

(a) Unscrew four screws (1) and remove both covers (2) from power box (3).

(b) Tag cable assembly leads for position identification and disconnect them from power box (3).

(c) Loosen clamping nut (4) inside box and pull power box-to-neutralizer bar cable (5) out of power box.

(d) Loosen clamping nut (6) and pull power box-to-control box cable (7) out of power box (3).

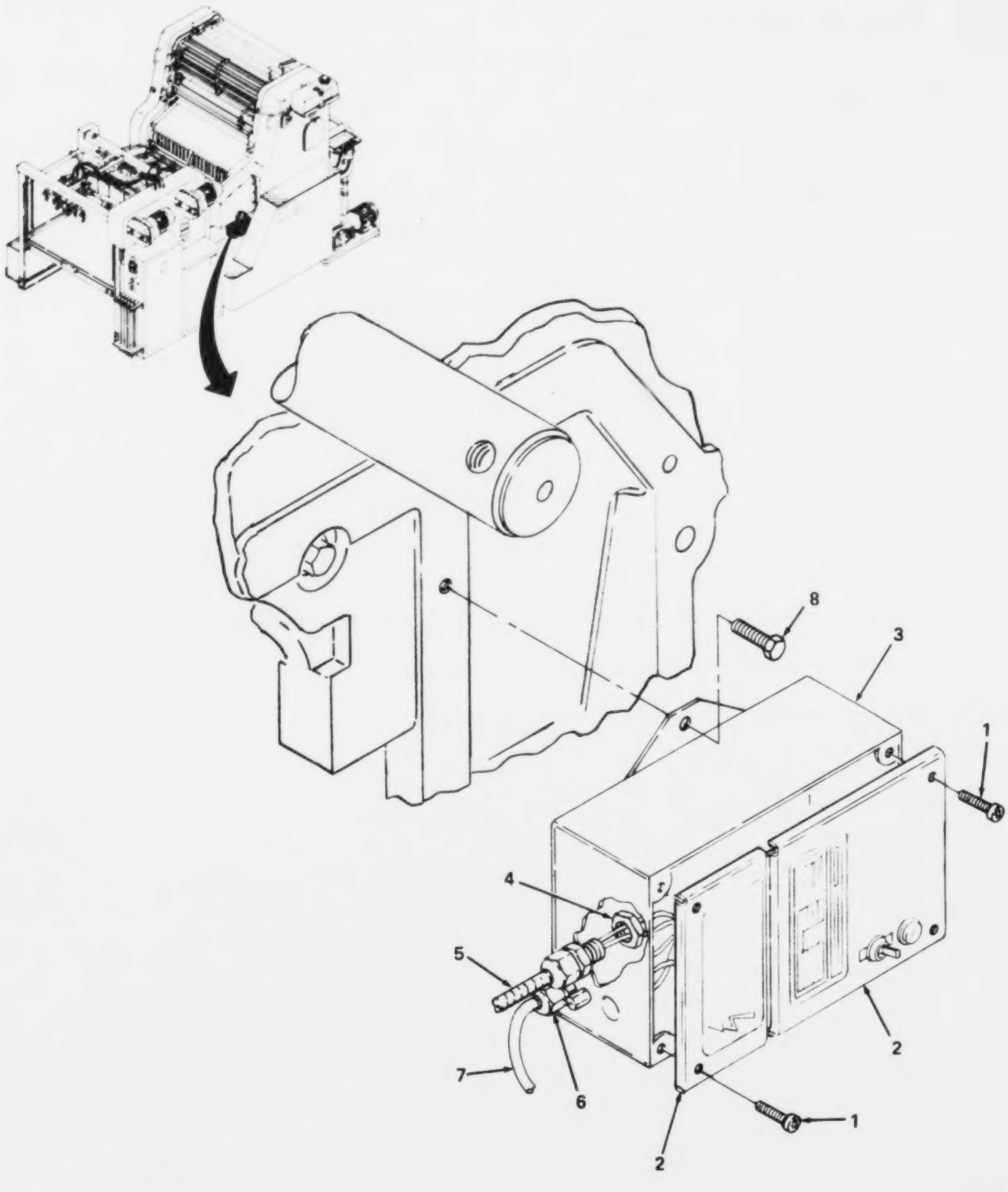
(e) Unscrew cap screw (8) and remove power box (3).

(f) Replace power box (3) with cap screw (8).

(g) Insert tagged cable wires (5, 6) through openings in side of power box (3). Connect wires as tagged and remove tags.

(h) Tighten clamping nuts (4, 5).

(i) Replace covers (2) with four screws (1).


8
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4
5
2
7
6
1
2
4710-174

Figure 2-231. Power Box Replacement.

2-83. Static Bar Assembly (cont).

(2) *Neutralizer bar.* (figure 2-232)

WARNING

ELECTRICAL SHOCK. Static electricity is retained in static eliminator bar for up to two hours after power is turned off. Touching static eliminator bar while charged may result in injury from electrical shock.

(a) Remove thumb screw (1), flat washer (2), and retainer (3).

(b) Remove holder (4) and nut (5).

(c) Remove bolt (6) and two nuts (7) and remove neutralizer bar (8).

NOTE

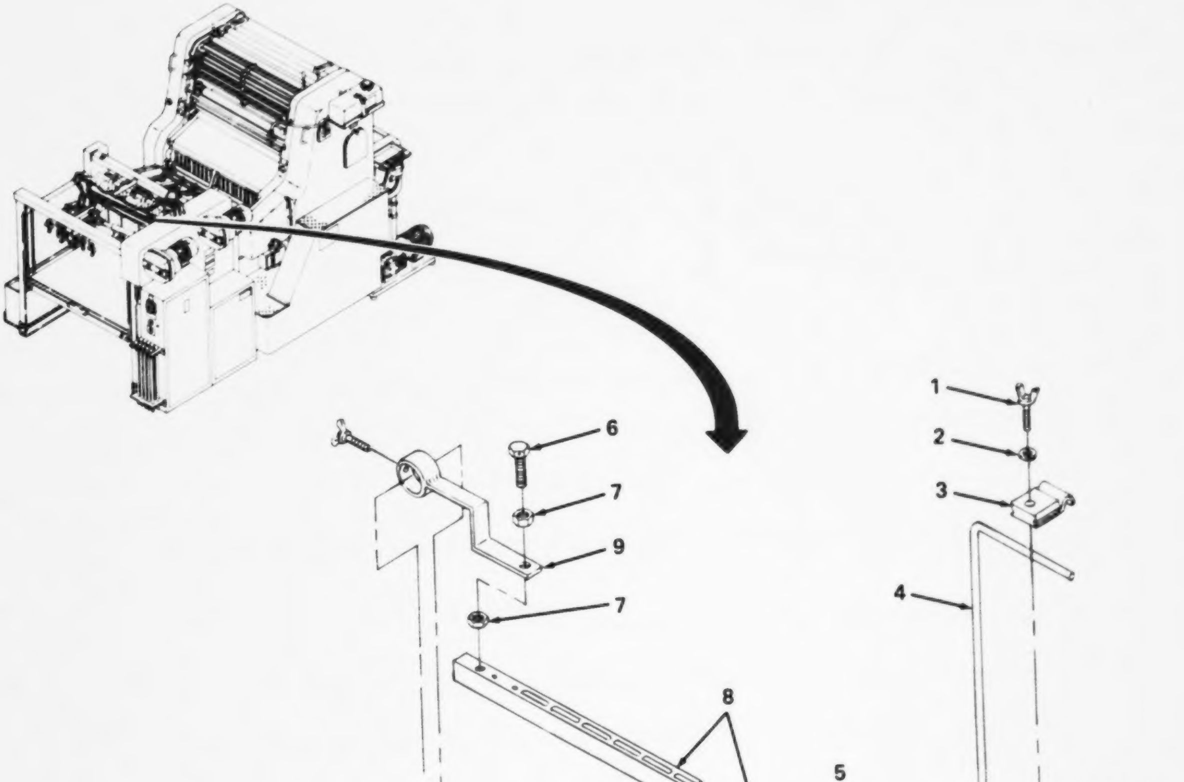
Do not remove holder (9).

(d) Thread bolt (6) through holder (9) and two nuts (7) and replace into neutralizer bar (8).

(e) Screw threaded end of holder (4) through nut (5) and replace into neutralizer bar (8).

(f) Replace retainer (3) with flat washer (2) and thumb screw (1).

b. *Repair.* Replace damaged or malfunctioning components.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4710-173

Figure 2-232. Neutralizer Bar Replacement.

2-84. Universal Joint Shaft.

This task covers:	a. Remove	b. Inspect	c. Repair	d. Install	e. Aline

INITIAL SETUP

Tools	*Equipment Conditions*
0.050 x 0.375 x 8 in. flat-tip screwdriver 10 mm combination wrench 6 mm pin punch Ball-peen hammer	Chain tension relieved

a. Remove. (figure 2-233)

NOTE

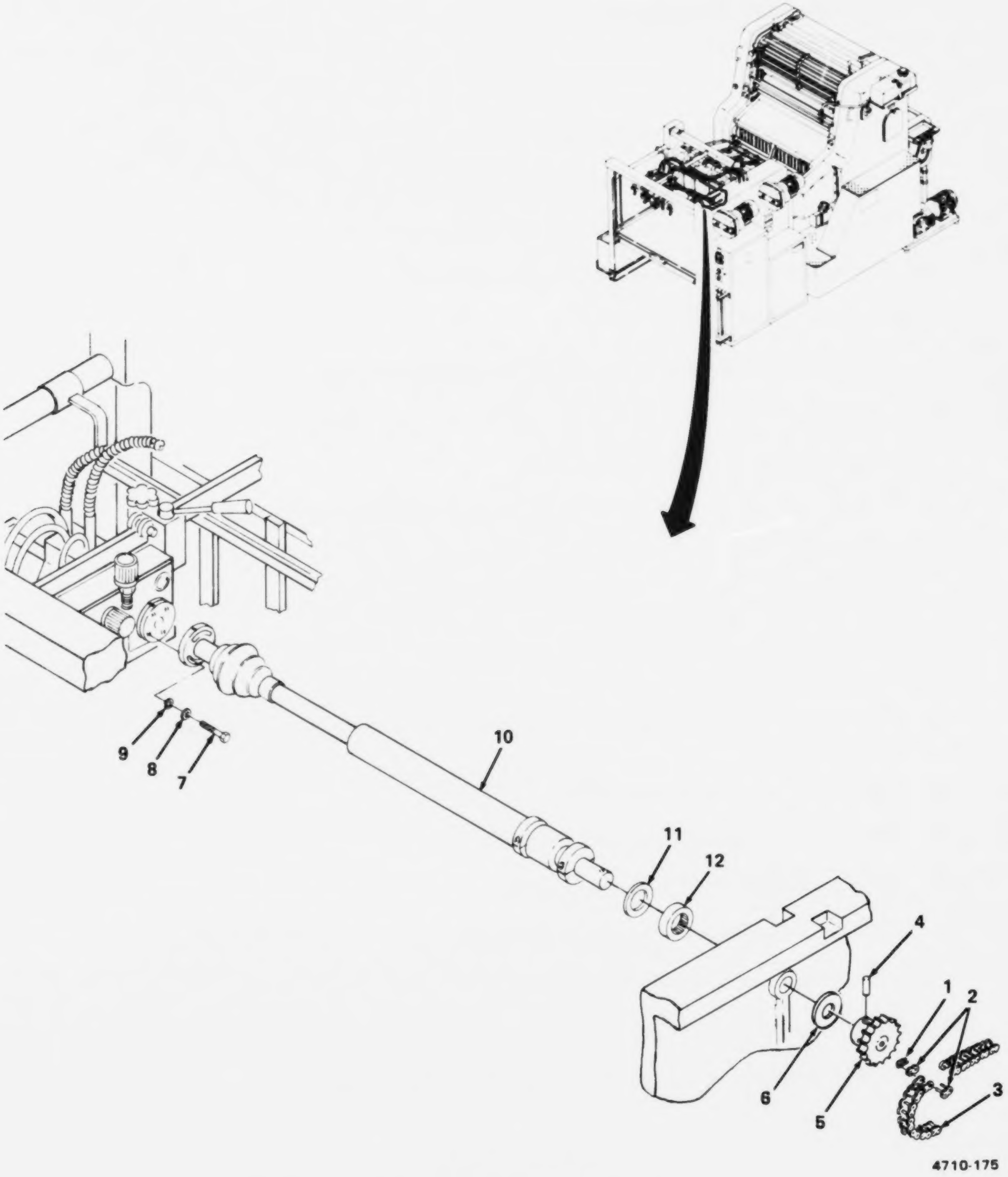
Lock suction head assembly in position before removing universal joint shaft to preserve timing.

(1) Remove clip (1), link sections (2), and chain (3).

(2) Remove spring pin (4), sprocket (5), and washer (6) from D/S of shaft.

(3) Remove two hex screws (7), washers (8), lockwashers (9), universal joint shaft (10), and washer (11).

(4) Remove needle bearing (12) from feeder frame.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5
4710-175

Figure 2-233. Universal Joint Shaft Removal.

2-84. Universal Joint Shaft (cont).

b. *Inspect.*

(1) Check siphons for tears, cracks, and dryrot.

(2) Check universal joints for binding and free movement.

(3) Check shaft for cracks, bends, or worn bushings.

(4) Check sprocket for burred, cracked, or missing teeth.

c. *Repair.* (figure 2-234)

(1) Remove four hex screws (1), hex nuts (2), and clamping rings (3).

(2) Remove siphons (4) and (5).

(3) Remove spring pin (6) and bearing bolt (7).

(4) Remove spring pins (8), shaft section (9), covering sleeve (10), and bushings (11).

(5) Separate shaft sections (12) and covering sleeve (13).

(6) Remove spring pins (14), and separate universal joint (15) from shaft section (12) and flange (16).

(7) Replace unserviceable items identified in the inspect procedure.

(8) Replace and aline flange (16) and shaft section (12) in universal joint (15). Replace spring pins (14).

(9) Slide siphon (5) over universal joint (14).

(10) Slide covering sleeve (13) on shaft section (12).

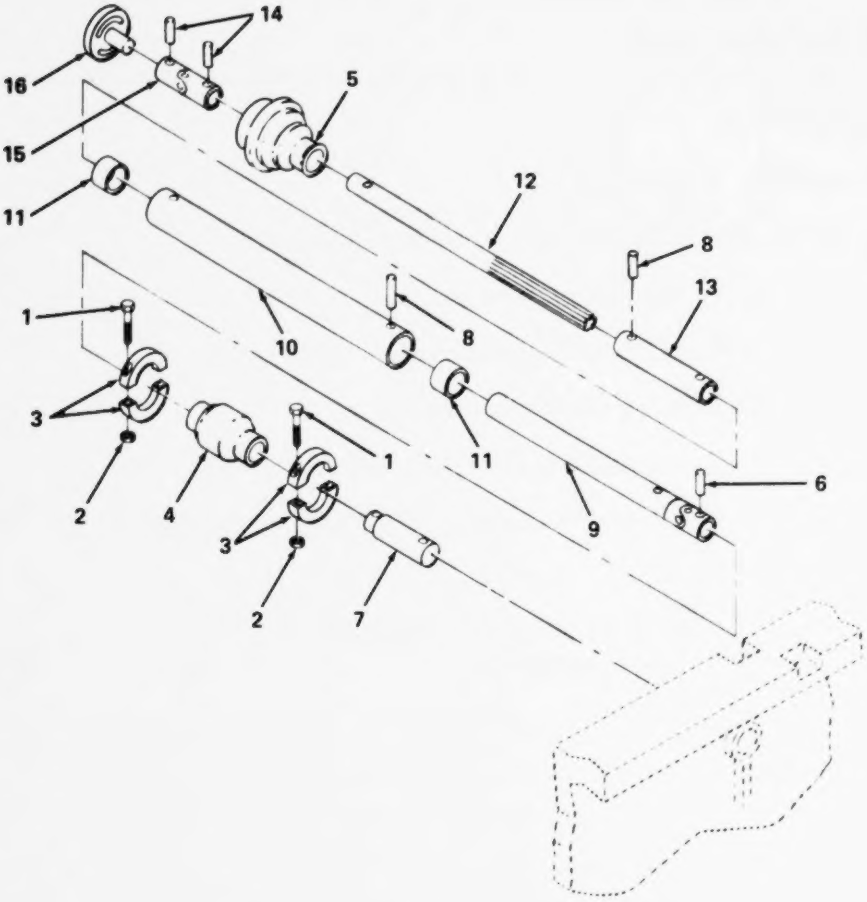
(11) Replace bushings (11) in covering sleeve (10).

(12) Replace covering sleeve (10) on shaft section (12).

(13) Replace shaft section (9) and spring pins (8).

(14) Replace bearing bolt (7) in universal joint on shaft (9), and replace spring pins (6).

(15) Replace siphon (4), clamp rings (3), hex nuts (2), and hex screws (1).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7

4710-176

Figure 2-234. Universal Shaft Assembly Repair.

2-84. Universal Joint Shaft (cont).

d. Install. (figure 2-235)

(1) Install needle bearing (1) in feeder frame.

(2) Install washer (3) and install D/S of shaft (3) in feeder frame.

(3) Install washer (4), sprocket (5), and spring pin (6).

(4) Aline timing notches (7) on shaft flange (8) and suction assembly flange (9).

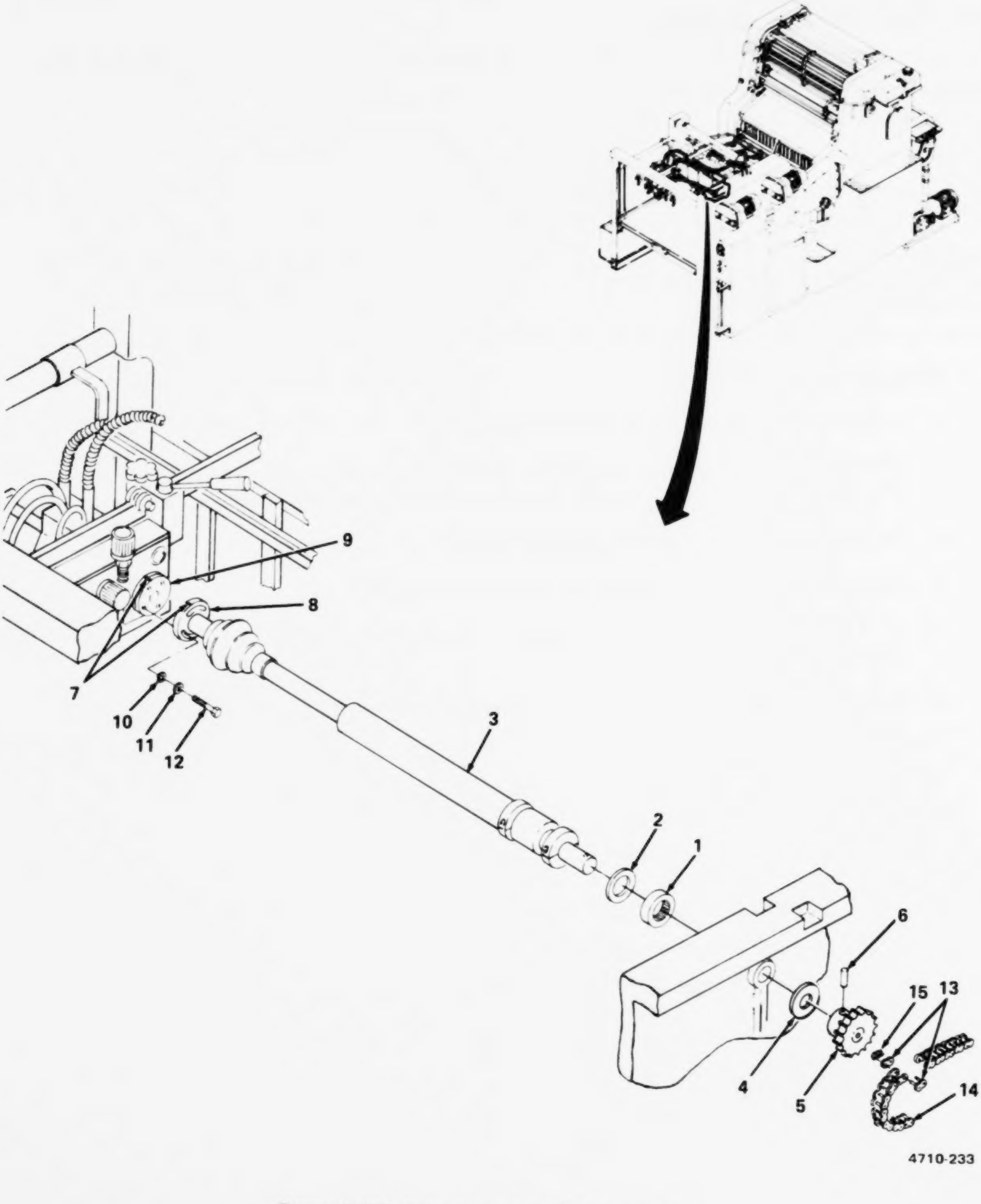
(5) Install two lockwashers (10), washers (11), and hex screw (12).

(6) Install link section (13) in chain end (14), and install C-clip (15).

e. Aline. Alinement of universal joint shaft is covered in suction head alinement (para. 2-85).

NOTE

FOLLOW-ON MAINTENANCE:
Adjust chain tension.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14
4710-233

Figure 2-235. Universal Joint Shaft Installation.

2-85. Suction Head Assembly.

This task covers:	a. Remove	b. Install	c. Aline

INITIAL SETUP

Tools	*Equipment Conditions*
Feeler gage 0.050 x 0.375 x 8 in. flat-tip screwdriver 10 mm combination wrench	Universal joint shaft removed (para. 2-84) Suction head valve housing removed (TM 5-3610-286-10, para. 3-13)

a. Remove. (figure 2-236)

(1) Loosen all hose clamps (1) and remove hoses (2).

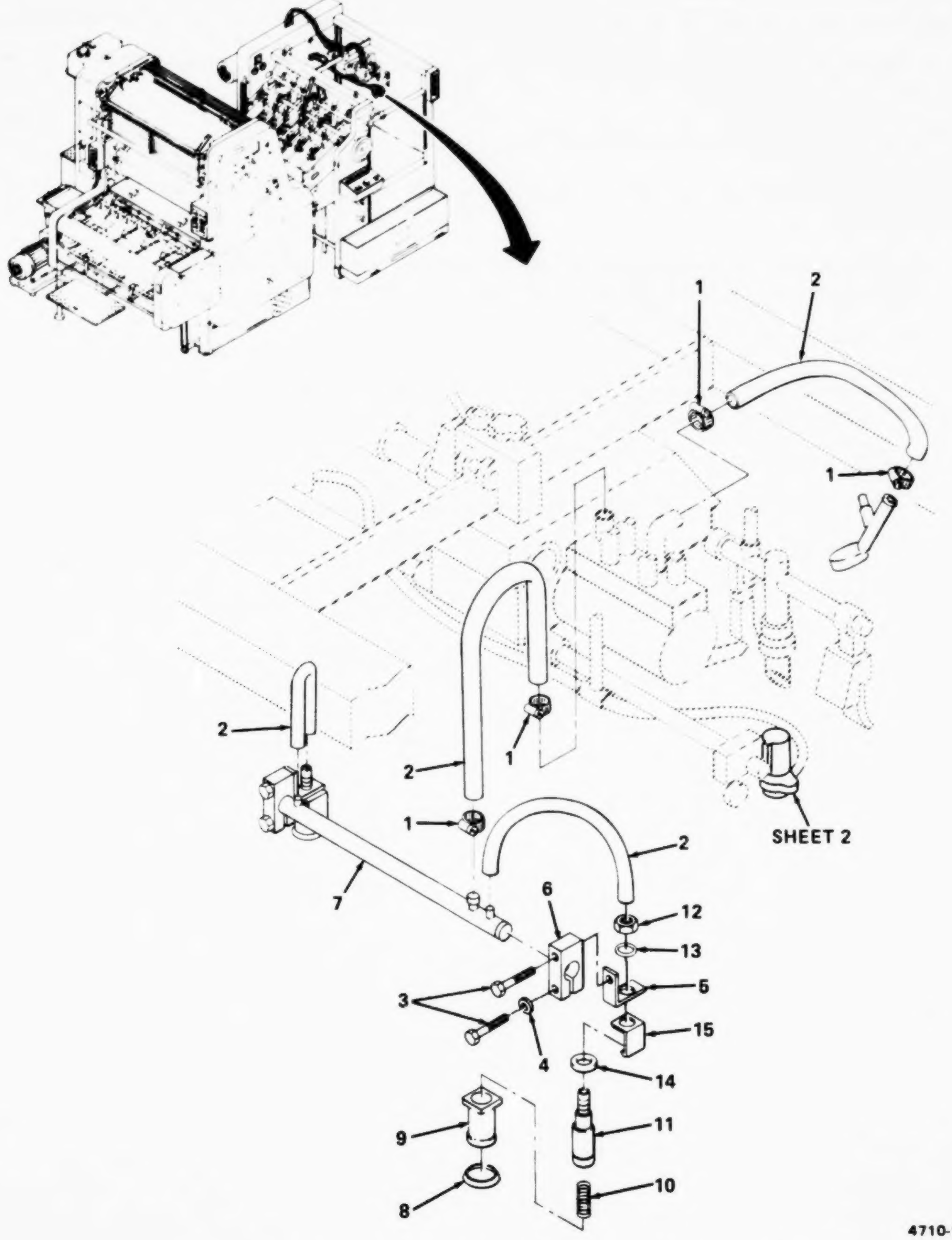
(2) Unscrew two screws (3) and one washer (4). Remove bracket (5), together with parts assembled to it, from clamping piece (6), and remove clamping piece from tube (7).

(3) Pull rubber disc (8) out of bottom of suction cup (9).

(4) Remove suction cup (9) and spring (10) from spring guide (11).

(5) Remove nut (12) and washer (13) and remove spring guide (11), washer (14), and lifting guide (15).

(6) Repeat steps 2 through 5 for components on opposite end of tube (7).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SHEET 2
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8
4710-177(1/2)

Figure 2-236. Suction Head Assembly Removal (Sheet 1 of 2).

2-85. Suction Head Assembly (cont).

(7) Loosen two socket-head screws (1) and slide assembled components (2 through 16) off rod (17).

(8) Remove two cap screws (2) and retainer (3).

(9) Remove pinion gear (4) from end of knurled bolt (5) and slide bolt out of forward sucker bracket (6).

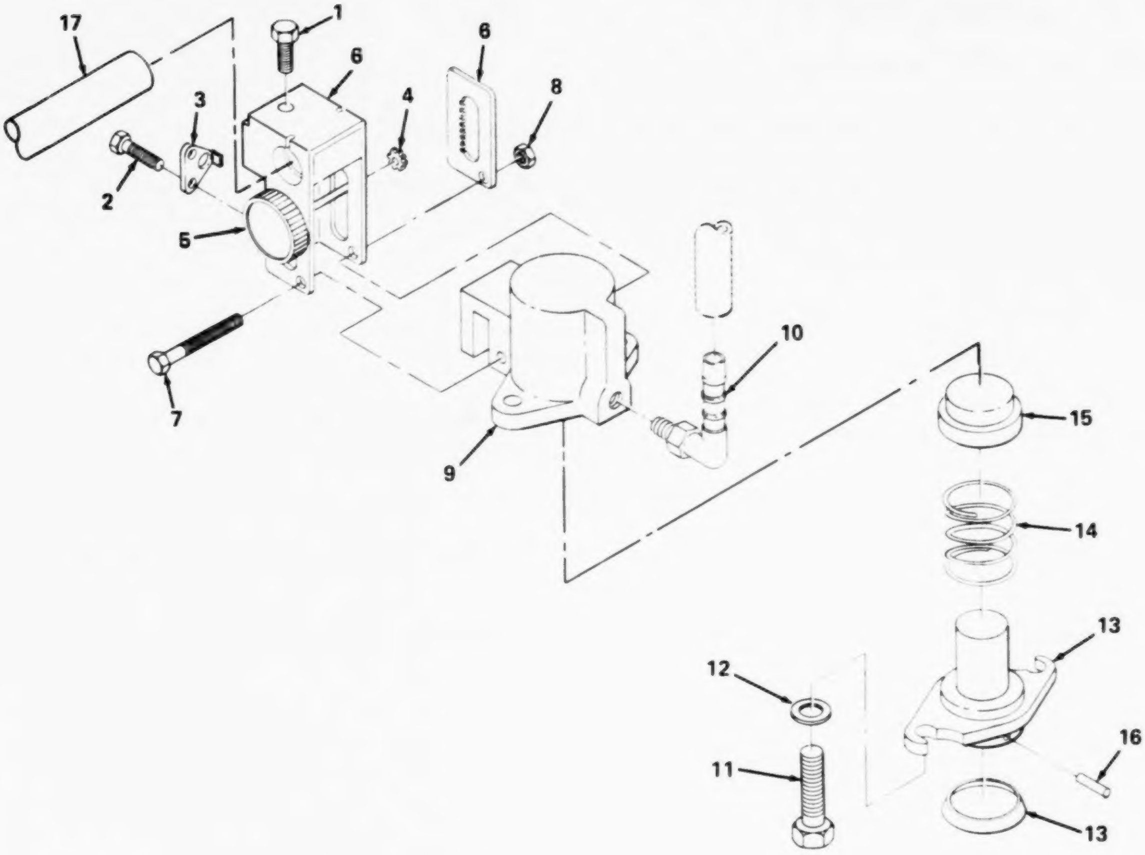
(10) Remove cheese-head screw (7) and nut (8) and remove forward sucker casing (9), together with parts assembled to it, from forward sucker bracket (6).

(11) Remove nozzle (10).

(12) Remove two cap screws (11) and two flat washers (12) and remove forward sucker head (13), compression spring (14), and bushing (15).

(13) Remove tapered pin (16).

(14) Repeat steps 7 through 13 for components at opposite end of rod (17).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4710-177(2/2)

Figure 2-236. Suction Head Assembly Removal (Sheet 2 of 2).

2-85. Suction Head Assembly (cont).

b. *Install.* (figure 2-237)

(1) Install tapered pin (1).

(2) Install bushing (2) in bottom of forward sucker casing (3).

(3) Slide compression spring (4) onto forward sucker head (5). Install forward sucker head with two cap screws (6) and two flat washer (7).

(4) Install nozzle (8).

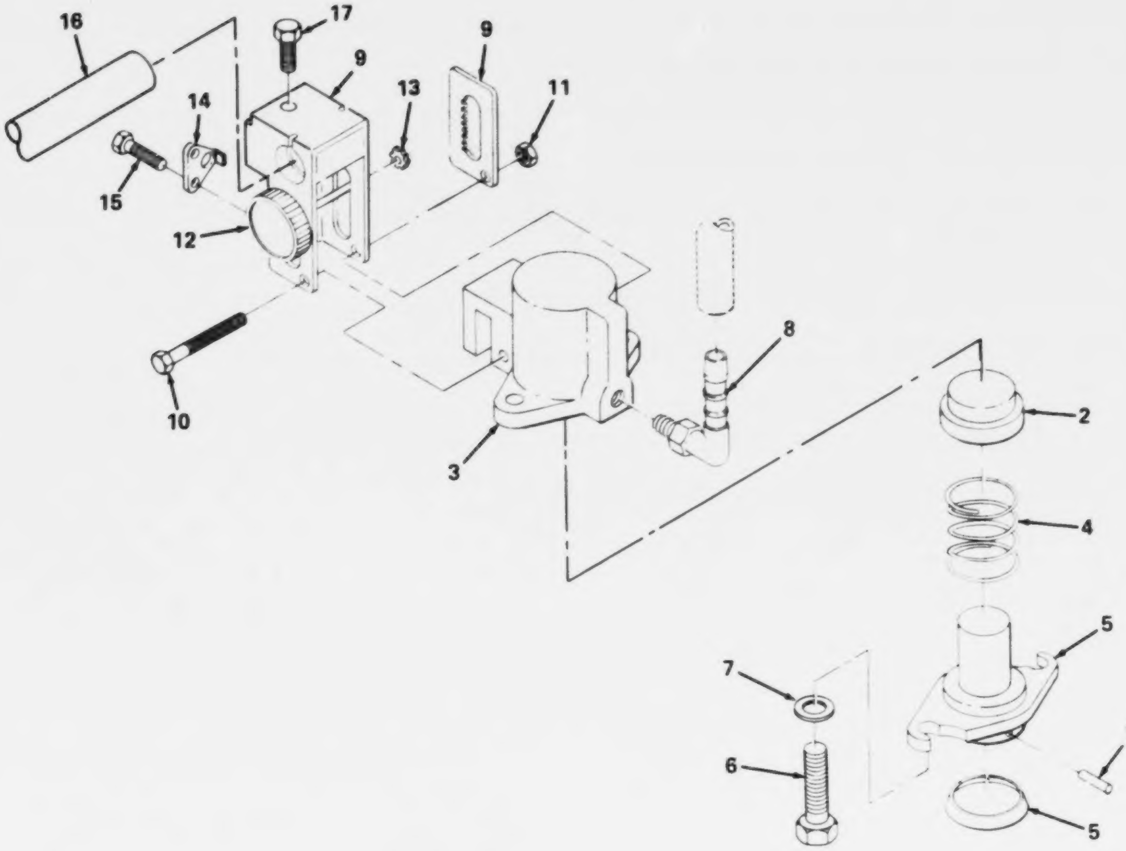
(5) Insert forward sucker casing (3) into forward sucker bracket (9) so that slots and bolt holes line up. Install cheese-head bolt (10) and nut (11).

(6) Insert shaft of knurled bolt (12) through slots in forward sucker bracket (9) and casing (3). Install pinion gear (13) on end of shaft.

(7) Install retainer (14) and two cap screws (15).

(8) Slide components assembled in steps 1 through 7 onto rod (16). Install two socket-head screws (17) and tighten.

(9) Repeat steps 1 through 8 for components at opposite end of rod (16).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4710-222(1/2)

Figure 2-237. Suction Head Assembly Installation (Sheet 1 of 2).

2-85. Suction Head Assembly (cont).

(10) Slide washer (1) onto spring guide (2).

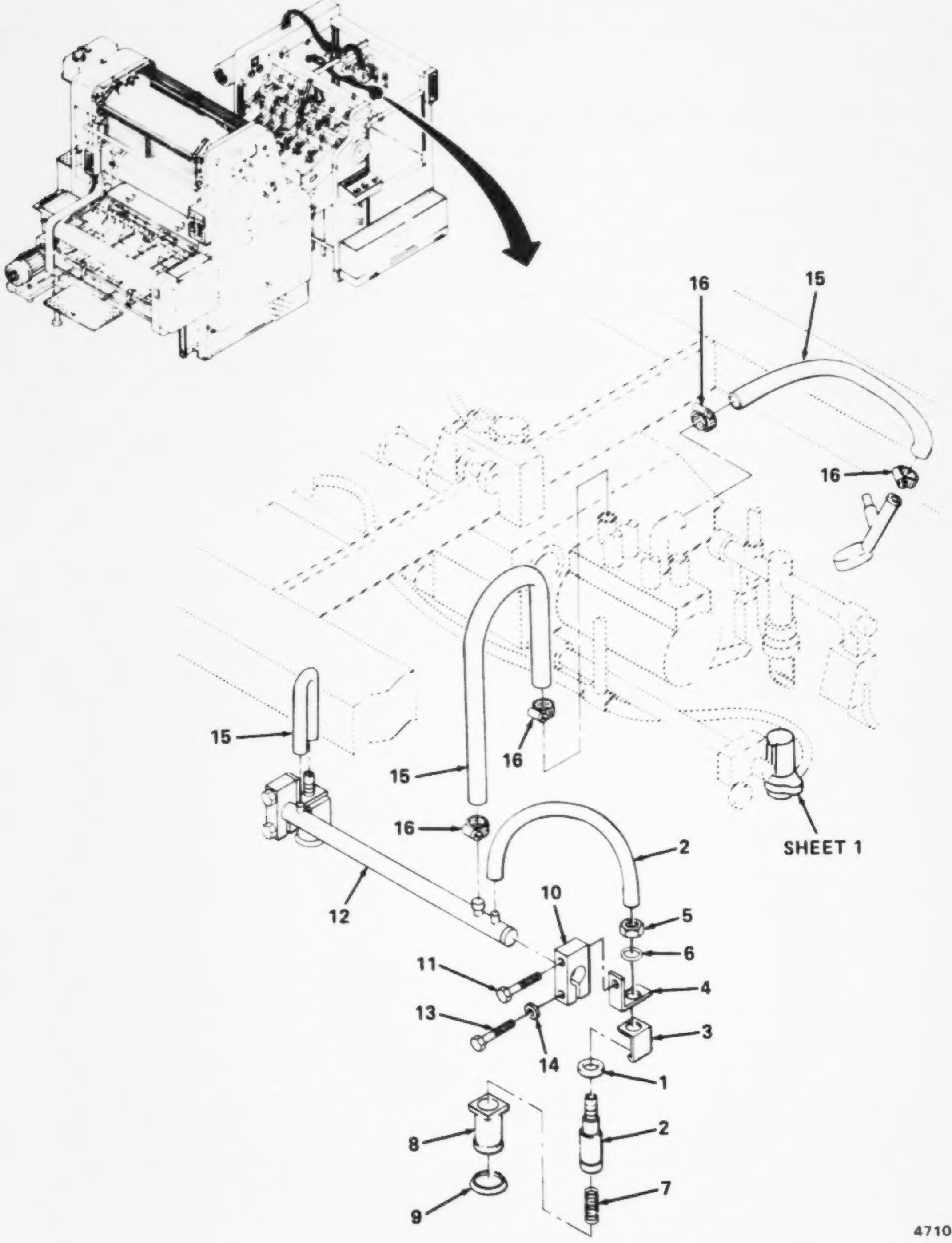
(11) Insert spring guide (2) through lifting guide (3) and bracket (4). Install nut (5) and washer (6).

(12) Install spring (7), suction cup (8), and rubber disc (9).

(13) Install bracket (4) on clamping piece (10) with upper of two cap screws (11).

(14) Slide components assembled in steps 10 through 13 onto tube (12). Install lower of two cap screws (13) and washer (14) and tighten to secure clamping piece (10) on tube.

(15) Install hoses (15) and secure with hose clamps (16).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4710-222(2/2)

Figure 2-237. Suction Head Assembly Installation (Sheet 2 of 2).

2-85. Suction Head Assembly (cont).

c. *Aline.*

(1) *Forwarding roller adjustment.* (figure 2-238)

NOTE

If suction head is not working properly, adjust forwarding roller before making any adjustments to suction head assembly.

(a) Turn feeder handwheel until both forwarding rollers (1) are parallel to roller shaft and in their lowest position.

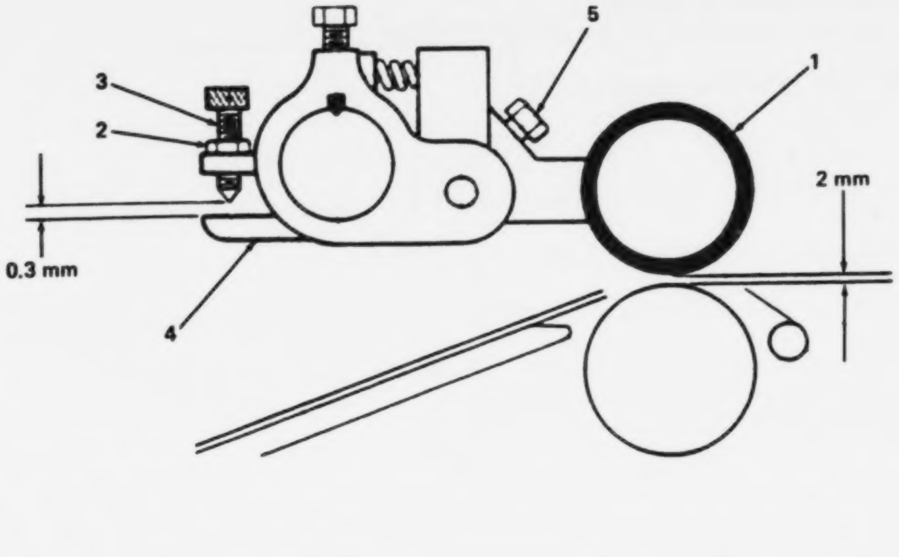
(b) Loosen nut (2) and turn forwarding roller adjusting screw (3) until there is a 0.3 mm clearance between lever (4) and adjusting screw (3).

(c) Turn handwheel and verify that forwarding rollers (1) touch roller shaft simultaneously. Slightly turn appropriate adjusting screw (3) to correct any imbalances.

(d) Turn on compressor and suction air unit.

(e) Turn handwheel until forwarding suckers lift sheet. Continue turning handwheel forward until forwarding suckers are just releasing sheet.

(f) Using feeler gage, measure clearance between rollers (1) and roller shaft. If 2 mm clearance is not obtained, correct timing difference by loosening two cap screws and adjusting the universal joint drive shaft flange at suction head.


5
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2
2 mm
0.3 mm
4
4710-178

Figure 2-238. Forwarding Roller Adjustment.

2-85. Suction Head Assembly (cont).

(2) *Microswitch b92 adjustment.* (figure 2-239)

NOTE

If microswitch b92 has been replaced, check and adjust switching point.

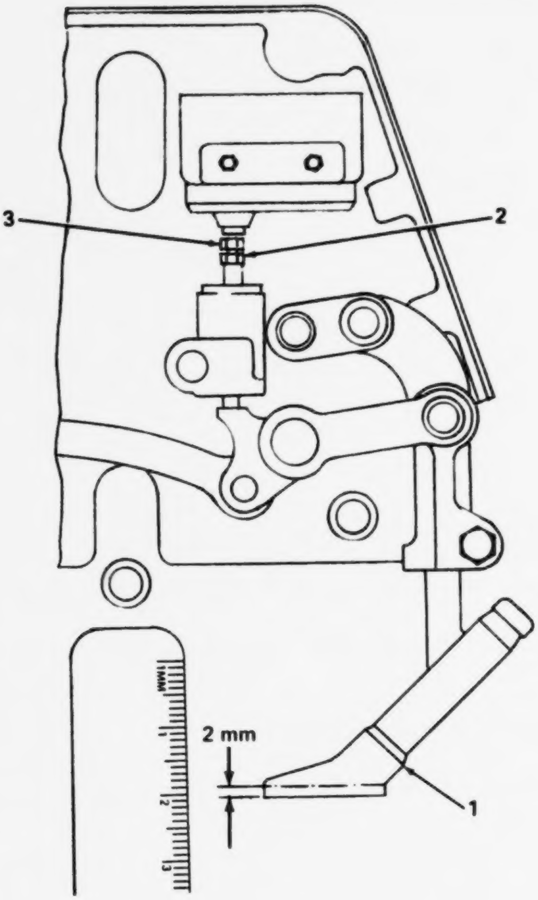
(a) Turn press main switch to ON position.

(b) Turn feeder by hand until governor foot (1) of suction head is at its lowest position.

(c) Lift governor foot (1) 2 mm. A microswitch click should be heard. If not, loosen counter nut (2) and turn hex screw (3) until switch clicks when governor foot is raised 2 mm. Tighten counter nut.

NOTE

FOLLOW-ON MAINTENANCE:
(1) Install universal joint shaft (para. 2-84).
(2) Install suction head valve housing (TM 5-3610-286-10, para. 3-13).



4710-223

Figure 2-239. Microswitch b92 Adjustment.

2-86. Sheet Forwarding Assembly.

This task covers: a. Remove b. Install

INITIAL SETUP

Tools

Retaining-ring pliers
Ball-peen hammer
10 mm combination wrench
5 mm hex key

a. Remove. (figure 2-240)

(1) Pull hoses (1) off air distributor (2).

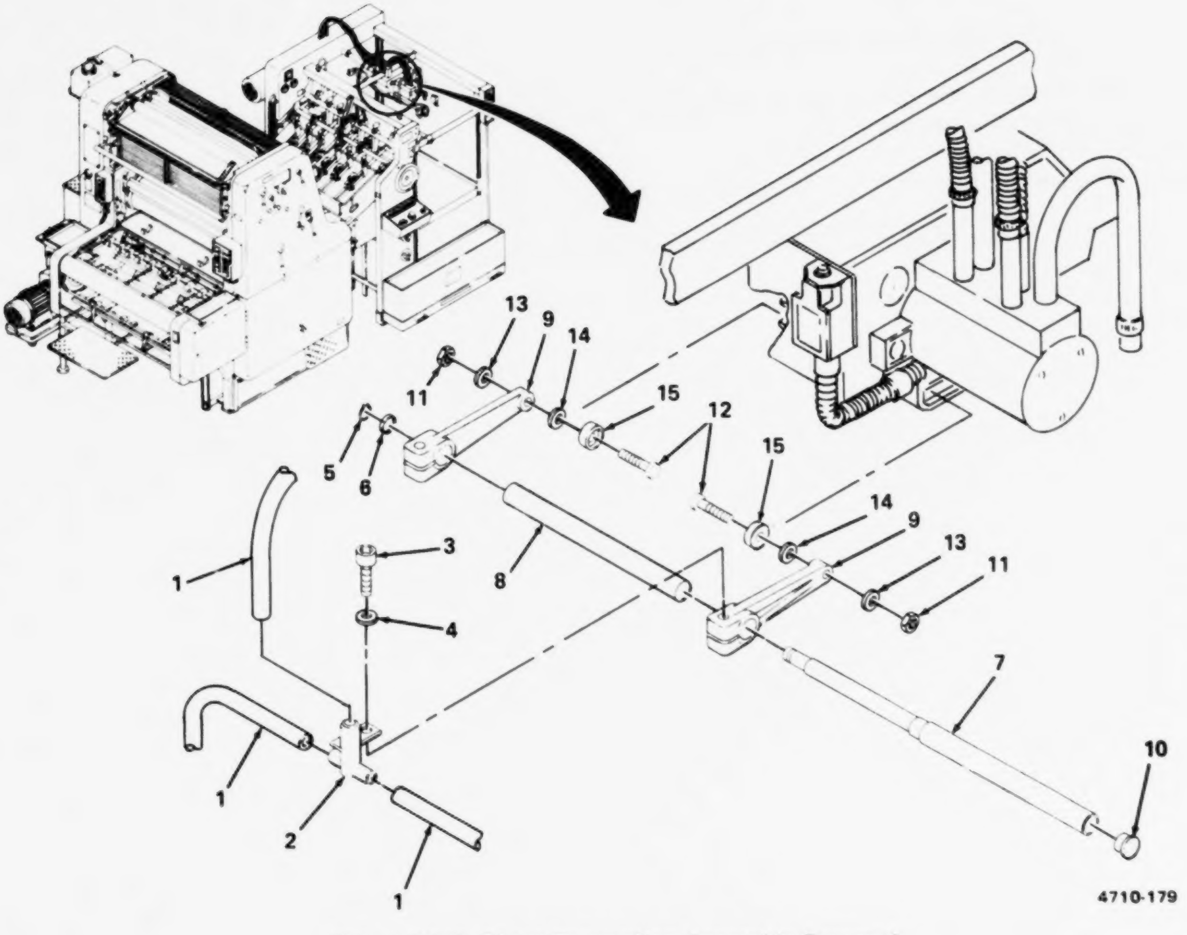
(2) Remove cap screw (3), safety washer (4), and air distributor (2).

(3) Remove retaining ring (5) and fitted disc (6) from end of sucker guide tube (7).

(4) Pull guide shaft (8) off sucker guide tube (7) and out of lever (9). Pull sucker guide tube out of lever.

(5) Pull plug (10) out of sucker guide tube (7).

(6) Unscrew nut (11) from end of threaded pin (12). Remove safety washer (13), spacer ring (14), bearing (15), pin, and lever (9).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4710-179

Figure 2-240. Sheet Forwarding Assembly Removal.

2-86. Sheet Forwarding Assembly (cont).

b. *Install.* (figure 2-241)

(1) Install each lever (1) with threaded pin (2), bearing (3), spacer ring (4), safety washer (5), and nut (6).

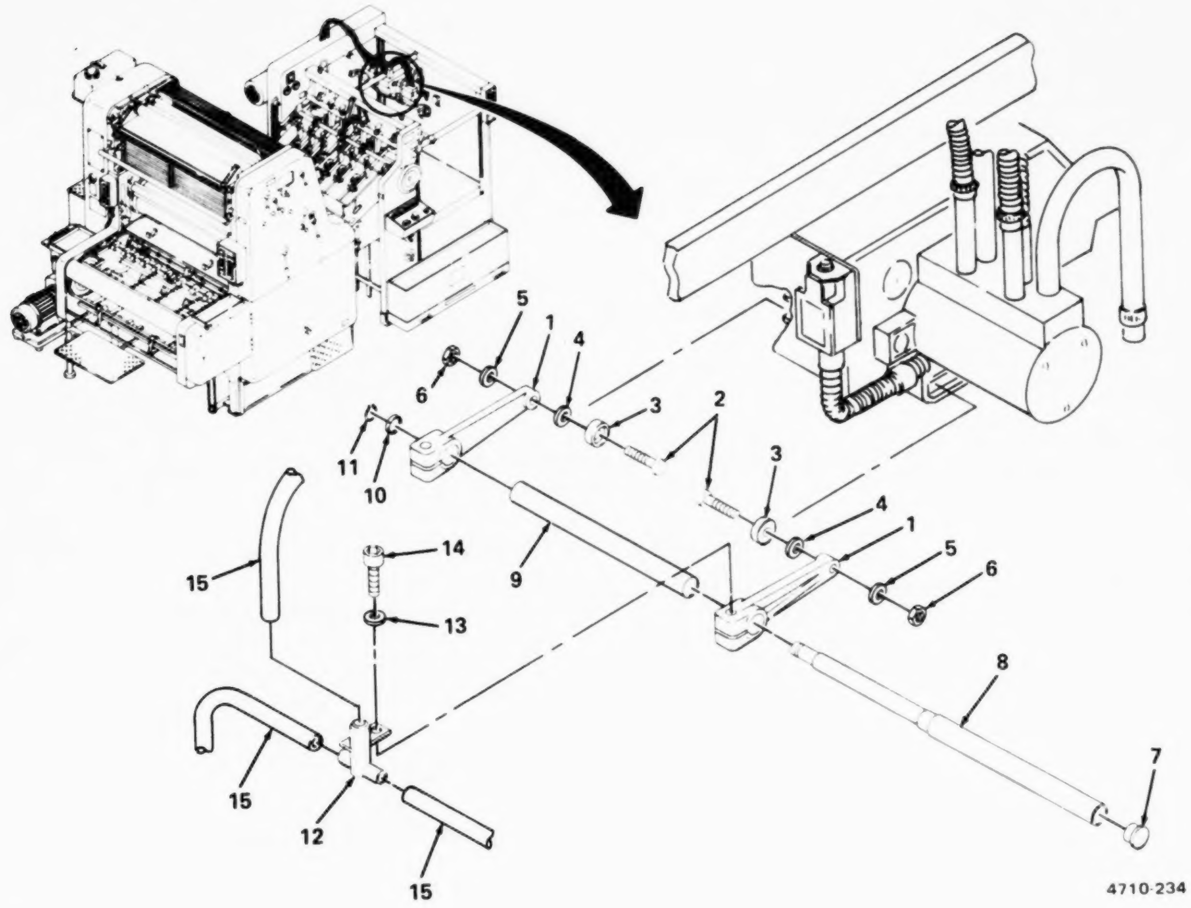
(2) Install plug (7) in end of sucker guide tube (8).

(3) Insert sucker guide tube (8) into lever (1). Insert guide shaft (9) into opposite lever and over sucker guide tube.

(4) Install fitted disc (10) and retaining ring (11) on end of sucker guide tube (8).

(5) Install air distributor (12) with safety washer (13), and cap screw (14).

(6) Install hoses (15) on air distributor (12).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4710-234

Figure 2-241. Sheet Forwarding Assembly Installation.

2-87. Double Sheet Detector Mechanism.

This task covers: a. Remove b. Repair c. Install

INITIAL SETUP

Tools

Ball-peen hammer
4 mm pin punch
0.050 x 0.375 x 8 in. flat-tip screwdriver
6 mm hex key
10 mm combination wrench
13 mm combination wrench

a. *Remove.* (figure 2-242)

(1) Remove two screws (1) and microswitch (2).

(2) Remove two screws (3), two safety washers (4) and two flat washers (5) and remove plate guide (6) from clamping piece (7).

(3) Remove shouldered screw (8), washer (9) and nut (10) and remove cam lever (11) from clamping piece (7).

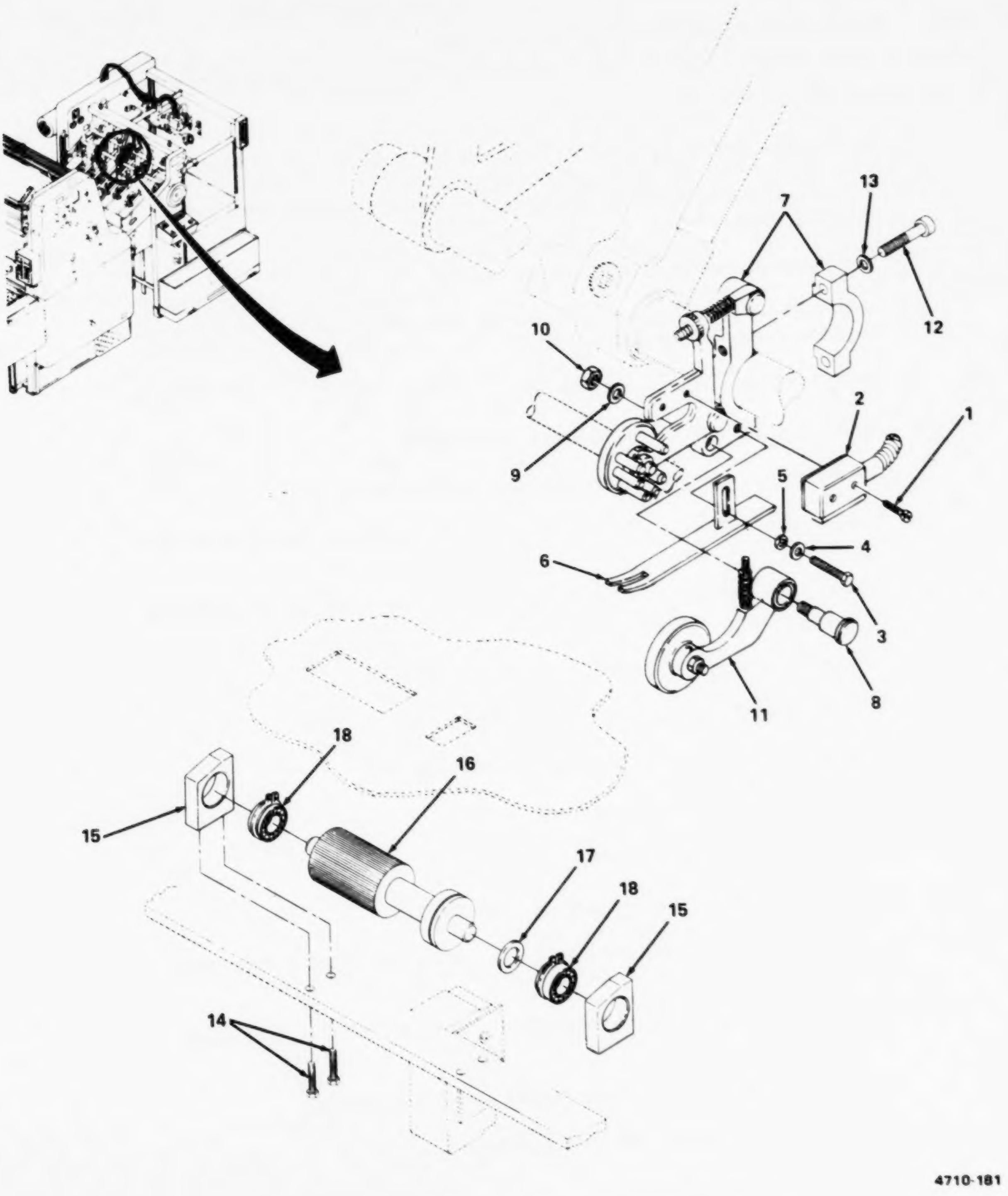
(4) Remove two socket-head screws (12) and safety washers (13).

(5) Separate halves of clamping piece (7) and remove clamping piece together with parts assembled to it.

NOTE

The roller and associated bearings are accessible from under the feeder table.

(6) Remove two screws (14) from each bearing (15) and remove roller (16), spacer (17), and two grooved roller bearings (18).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4710-181

Figure 2-242. Double Sheet Detector Mechanism Removal.

2-87. Double Sheet Detector Mechanism (cont).

b. *Repair.* (figure 2-243)

(1) Remove spring tension pin (1) from pin (2) and remove pin (2) from rod head (3).

(2) Remove shouldered screw (4), washer (5), and nut (6) and remove control lever (7) from clamping piece (8).

(3) Remove needle bushing (9) from control lever (7).

(4) Removed knurled nut (10) and flat washer (11), and remove compression spring (12) and headless screw (13) from control lever (7).

(5) Remove bushing (14) from cam lever (15).

(6) Remove compression spring (16) from grub screw (17)

(7) Loosen two nuts (18) and remove grub screw (17) from cam lever (15).

(8) Remove spring tension pin (19) and remove pin (20), bearing (21), and roller (22) from cam lever (15).

(9) Remove spring tension pin (23) and remove pin (24), bearing (25), and roller (26) from control lever (7).

(10) Remove locking rings (27) from grooved ball bearings (28).

(11) Replace roller (29) or spacer (30) if worn or damaged.

(12) Replace any worn or binding needle or roller bearings.

(13) Replace any damaged or worn bushings.

(14) Replace any broken or weak springs.

(15) Replace locking rings (27) on grooved ball bearings (28).

(16) Replace pin (24), bearing (25), and roller (26) on control lever (7) and replace spring tension pin (23).

(17) Replace pin (20), bearing (21), and roller (22) on cam lever (15) and replace spring tension pin (19).

(18) Replace grub screw (17) in cam lever (15) and tighten two nuts (18).

(19) Replace compression spring (16) on grub screw (17).

(20) Replace bushing (14) in cam lever (15).

(21) Replace compression spring (12) on headless screw (13).

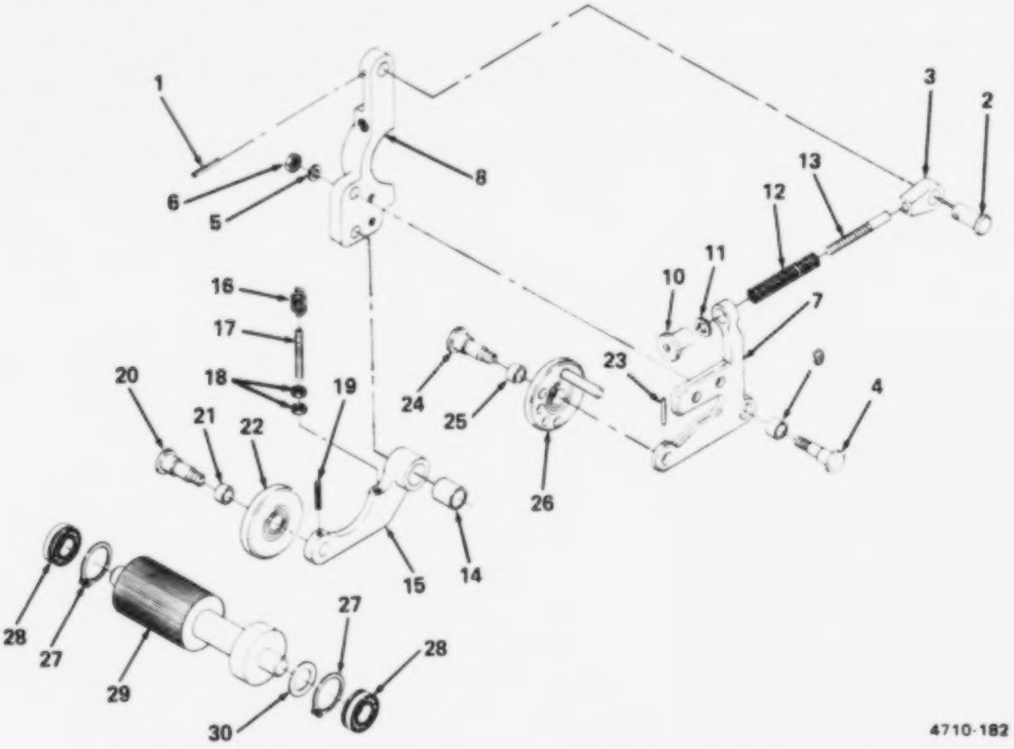
(22) Replace headless screw (13) in control lever (7) and replace knurled nut (10) and flat washer (11) on headless screw (13).

(23) Replace needle bushing (9) in control lever (7).

(24) Position control lever (7) on clamping piece (8) and replace shouldered screw (4), washer (5), and nut (6).

(25) Aline rod head (3) with hole in clamping piece (8) and replace pin (2).

(26) Drive spring tension pin (1) into pin (2).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4710-182

Figure 2-243. Double Sheet Detector Mechanism Repair.

2-87. Double Sheet Detector Mechanism (cont).

c. *Install.* (figure 2-244)

(1) Replace two grooved roller bearings (1), spacer (2), and roller (3) in bearings (4).

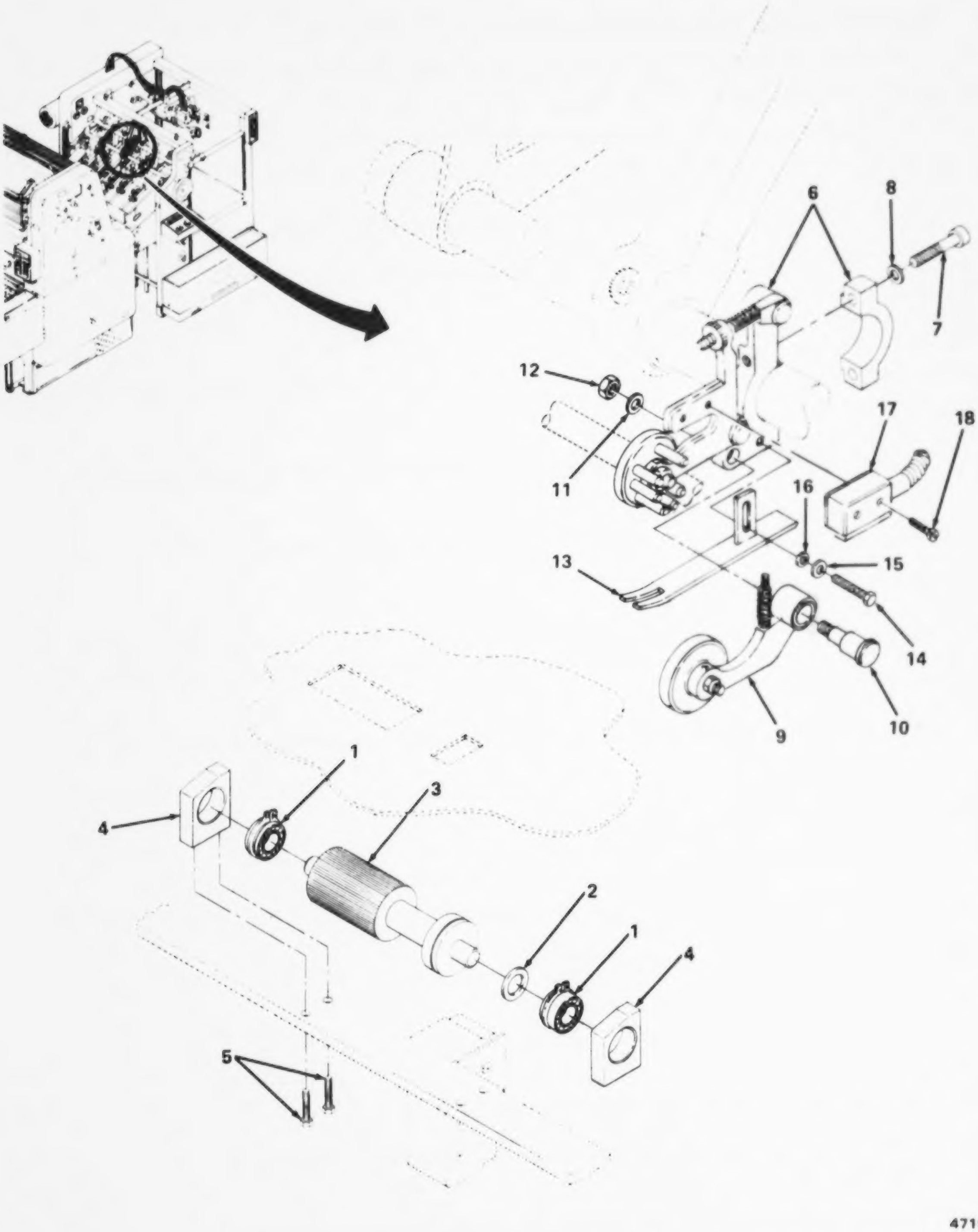
(2) Position bearings (4) on feeder and replace two screws (5) in each bearing and tighten.

(3) Position two halves of clamping piece (6), together with parts assembled to it, on feeder and join with two socket-head screws (7) and safety washers (8).

(4) Position cam lever (9) on clamping piece (6) and fasten with shouldered screw (10), washer (11) and nut (12).

(5) Position plate guide (13) on clamping piece (6) and fasten with two screws (14), two safety washers (15) and two flat washers (16).

(6) Position microswitch (17) on double sheet detector and fasten with two screws (10).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4710-228

Figure 2-244. Double Sheet Detector Mechanism Installation.

2-88. Magnetic Clutch Assembly.

This task covers: a. Test b. Repair

INITIAL SETUP

Tools	*Additional Personnel Requirement*
5 mm hex key 17 mm combination wrench 0.050 x 0.375 x 8 in. flat-tip screwdriver Retaining-ring pliers	Electrician MOS 35E20

a. Test.

(1) Load feeder with onion skin paper and put feeder timing adjustment "Paper-Cardboard" to "Paper".

(2) Operate press and let feeder advance until first sheet of paper arrives at front lays.

(3) Stop press and remove first sheet.

(4) Inch press forward until front lays are just hitting lowest point. The front edge of the next sheet of paper fed to press should be approximately 5 mm before the front lay stop (see para. 2-52).

(5) If timing is faulty, adjust by rotating magnetic clutch adjusting disk forward or backward until timing is correct.

b. Repair.

(1) *Disassembly.* (figure 2-245)

(a) Remove socket-head screw (1), washer (2), and guard (3).

(b) Break chain (4) at master link and remove.

(c) Break chain (5) at master link and remove.

(d) Remove oil fitting (6).

(e) Remove cable connection (7) to magnetic clutch s21 (8).

(f) Remove three hex-head screws (9), washers (10), standoffs (11), and clutch assembly (12).

(g) Remove retaining ring (13), two washers (14), magnetic clutch (8), washer (15), needle bearing (16), sprocket (17), needle bearing (18), and clutch shaft (19).

(h) Remove spring tension pin (20) and sprocket (21).

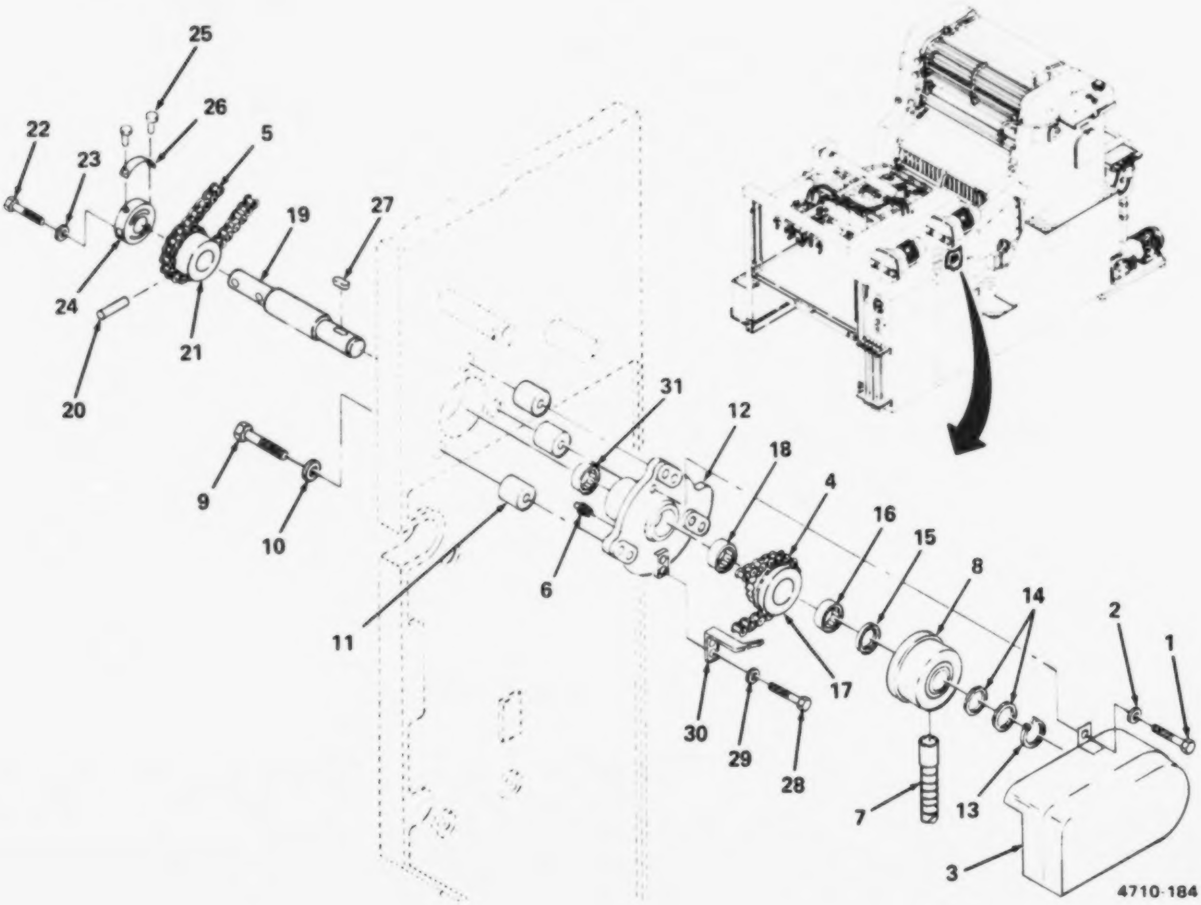
(i) Remove two hex-head screws (22), washers (23), and adjusting disc (24).

(j) Remove two rivets (25) and indicator plate (26).

(k) Remove key (27).

(l) Remove socket-head screw (28), washer (29), and angle piece (30).

(m) Remove needle bearing (31).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4710-184

Figure 2-245. Magnetic Clutch Assembly Disassembly.

2-88. Magnetic Clutch Assembly (cont).

(2) *Assembly.* (figure 2-246)

(a) Replace worn, damaged or malfunctioning components.

(b) Replace needle bearing (1) in clutch assembly (2).

(c) Replace angle piece (3), washers (4), and socket-head screws (5).

(d) Replace key (6).

(e) Replace indicator plate (7) and two rivets (8).

(f) Replace adjusting disc (9), two washers (10), and hex-head screws (11).

(g) Replace sprocket (12) and spring tension pin (13).

(h) Replace clutch shaft (14) through clutch assembly (2).

(i) Replace needle bearing (15), sprocket (16), needle bearing (17), washer (18), magnetic clutch (19), two washers (20), and retaining ring (21).

(j) Replace clutch assembly (2), three standoffs (22), three washers (23), and hex-head screws (24).

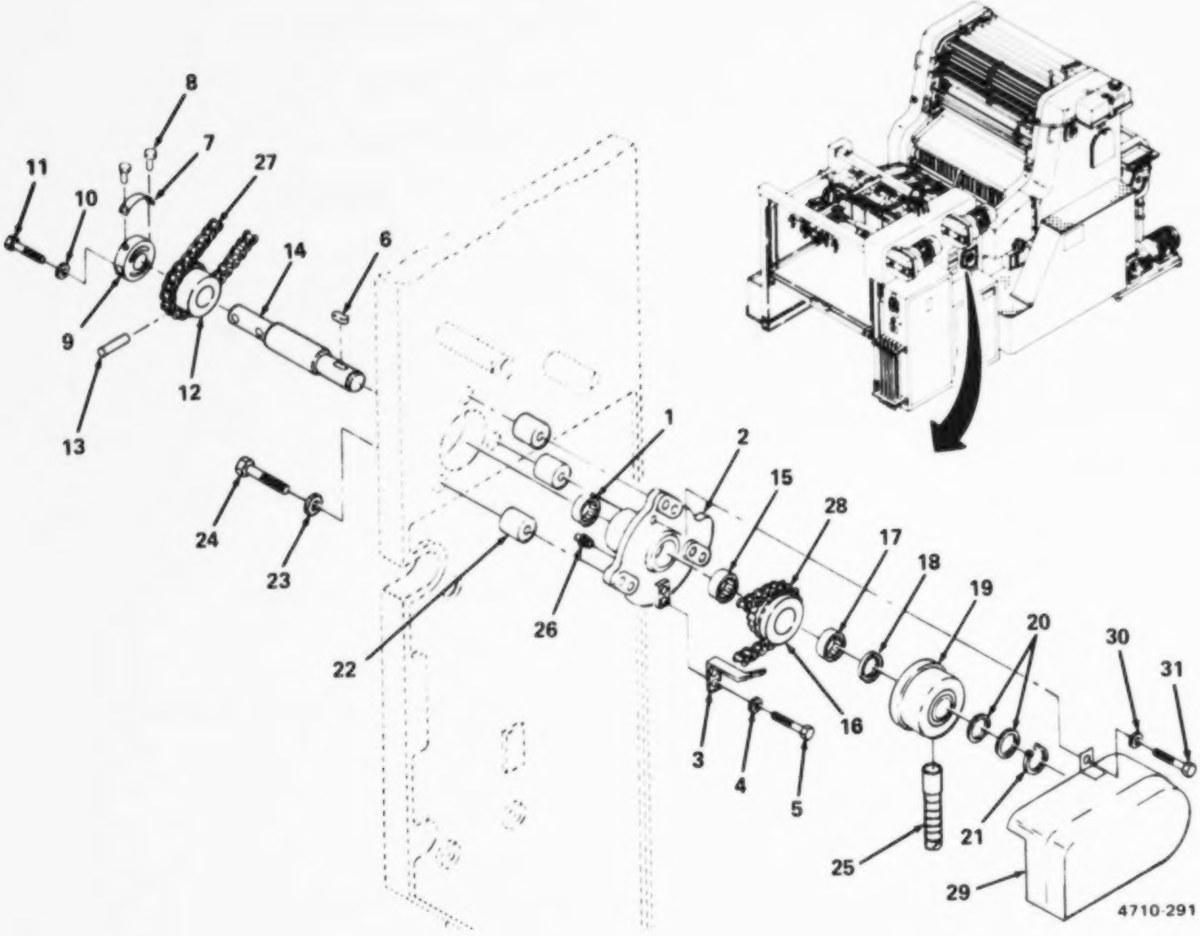
(k) Replace cable connection (25) to magnetic clutch s21 (19).

(l) Replace oil fitting (26).

(m) Replace chain (27) on sprocket (12).

(n) Replace chain (28) on sprocket (16).

(o) Replace guard (29), washer (30), and socket-head screw (31).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4710-291

Figure 2-246. Magnetic Clutch Assembly Repair.

NOTE

FOLLOW-ON MAINTENANCE:
Adjust feeder chain timing (para. 2-96).

2-89. Pile Lift Control Switches.

This task covers: a. Test b. Remove c. Install d. Aline

INITIAL SETUP

Tools

1 mm feeler gage
0.050 x 0.375 x 8 in. flat-tip screwdriver
No. 2 x 4. in. cross-tip screwdriver
4 mm hex key
10 mm combination wrench
Multimeter

Equipment Conditions

Main power box panel removed (para. 2-93)
Neutralizer bar removed (para. 2-83)
Lower guard (O/S) removed (para. 2-18)

Additional Personnel Requirement

Electrician MOS 35E20

General Safety Instructions

WARNING

Shut off power source before attempting to disconnect, service, or connect wires or cables. Failure to do so may result in death or serious injury.

a. Test.

NOTE

Refer to table 2-5, Troubleshooting, to determine switch to be tested.

(1) Test upper main pile limit switch (b36) as described in paragraph 2-16.

(2) Test lower main pile limit switch (b37), upper auxiliary pile limit switch (b87), and lower auxiliary pile limit switch (b91) in the same manner as (b36).

b. Remove.

(1) *Feeder guard.* (figure 2-247)

(a) Loosen two hose clamps (1) and remove two hoses (2) and move out of way.

(b) Loosen connector clamp and remove connector (3) and move out of way.

(c) Remove two hex-head screws (4) from inside of feeder.

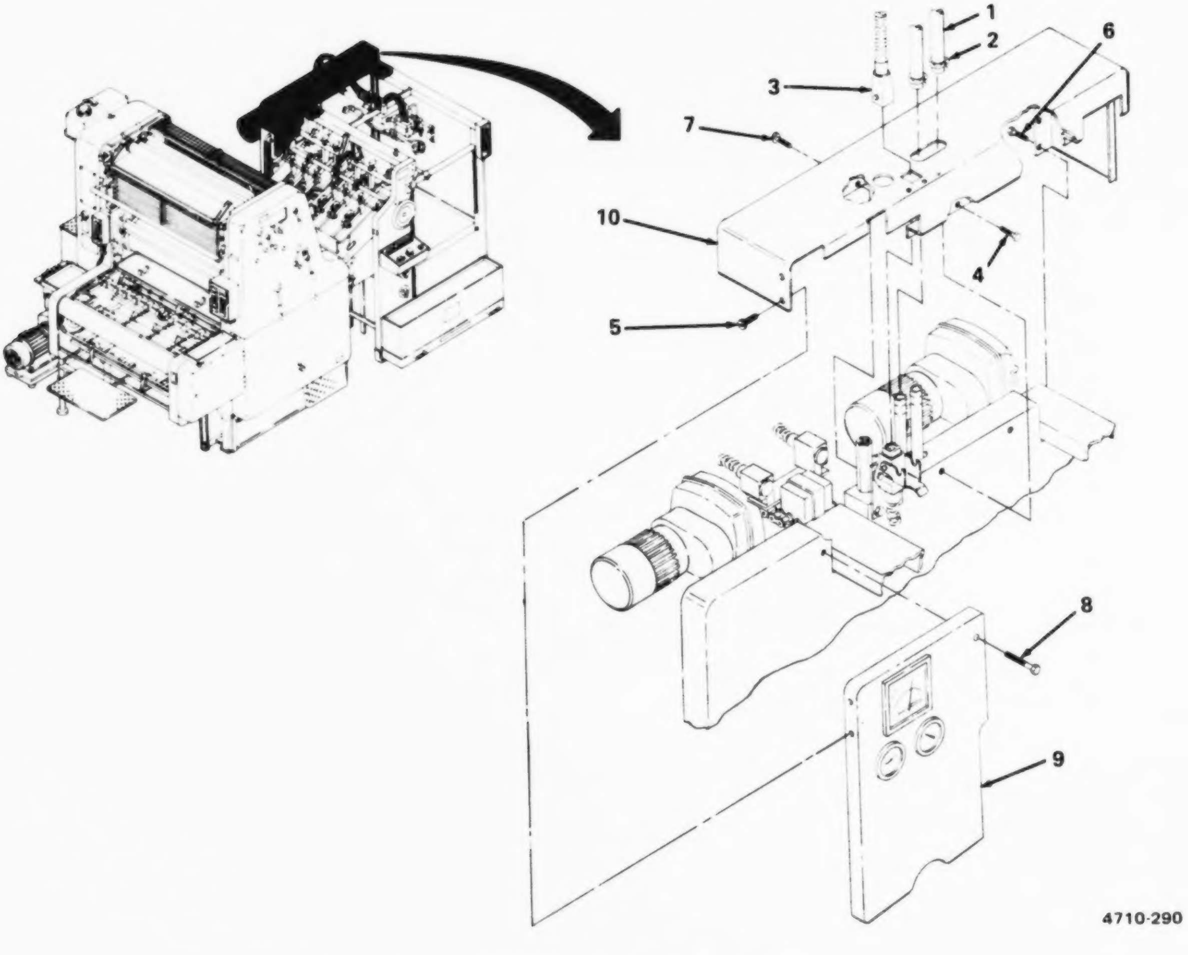
(d) Remove three slotted screws (5) on press end of feeder.

(e) Remove four hex-head screws (6) from feeder (D/S).

(f) Remove two slotted screws (7) from feeder (D/S).

(g) Remove one slotted screw (8) from gage panel (9) and move panel out of way.

(h) Remove guard (10).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4710-290

Figure 2-247. Feeder Guard Removal.

2-89. Pile Lift Control Switches (cont).

(2) *Pile lift control switches.* (figure 2-248)

WARNING

Hazardous electrical voltages exist within printing press. Do not connect or disconnect any electrical components while power is on. Death, serious electrical shock, or burns may result.

(a) Loosen two cross-head screws (1) and open switch cover (2).

(b) Loosen two cross-head terminal screws (3) and tag and remove leads (4).

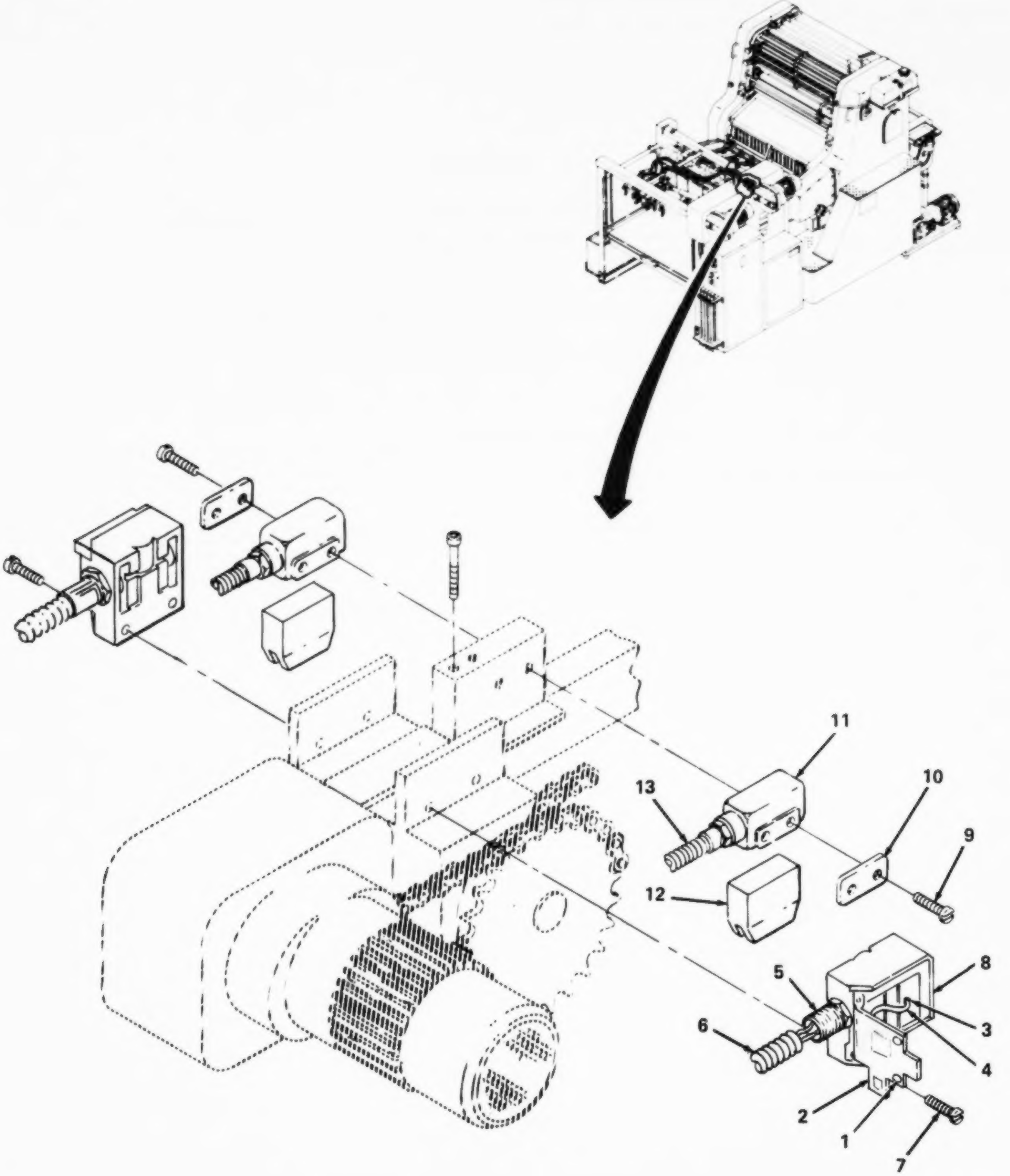
(c) Loosen collar (5) and remove cable (6).

(d) Remove two slotted screws (7) and remove switch (8).

(e) Remove two slotted screws (9), drawer frame (10), microswitch (11) and microswitch casing (12).

(f) Tag and remove leads and cable (13).

(g) Replace defective switches.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4710-185

Figure 2-248. Pile Lift Control Switches Removal.

2-89. Pile Lift Control Switches (cont).

c. *Install.*

(1) *Pile lift control switches.* (figure 2-249)

WARNING

Hazardous electrical voltages exist within printing press. Do not connect or disconnect any electrical components while power is on. Death, serious electrical shock, or burns may result.

(a) Replace cable (1) and attach tagged leads to microswitch (2). Remove tags.

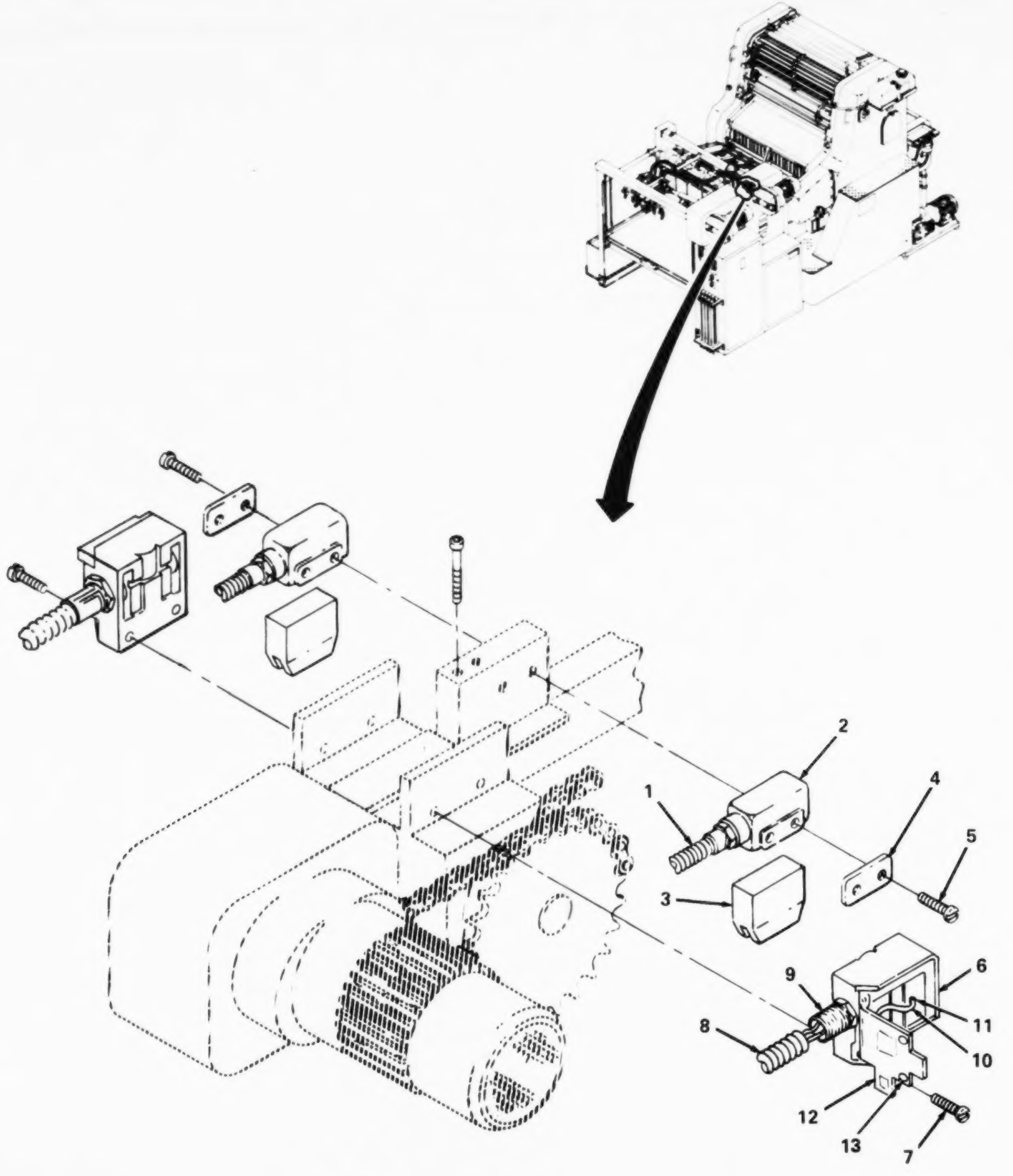
(b) Replace microswitch casing (3), microswitch (2), drawer frame (4), and two slotted screws (5).

(c) Replace switch (6) and two slotted screws (7).

(d) Replace cable (8) and tighten collar (9).

(e) Replace tagged leads (10) and tighten two cross-head terminal screws (11). Remove tags.

(f) Close switch cover (12) and tighten two cross-head screws (13).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4710-293

Figure 2-249. Pile Lift Control Switches Installation.

2-89. Pile Lift Control Switches (cont).

(2) *Feeder guard.* (figure 2-250)

(a) Install guard (1).

(b) Install gage panel (2) and install one slotted screw (3).

(c) Install two slotted screws (4) in feeder (D/S).

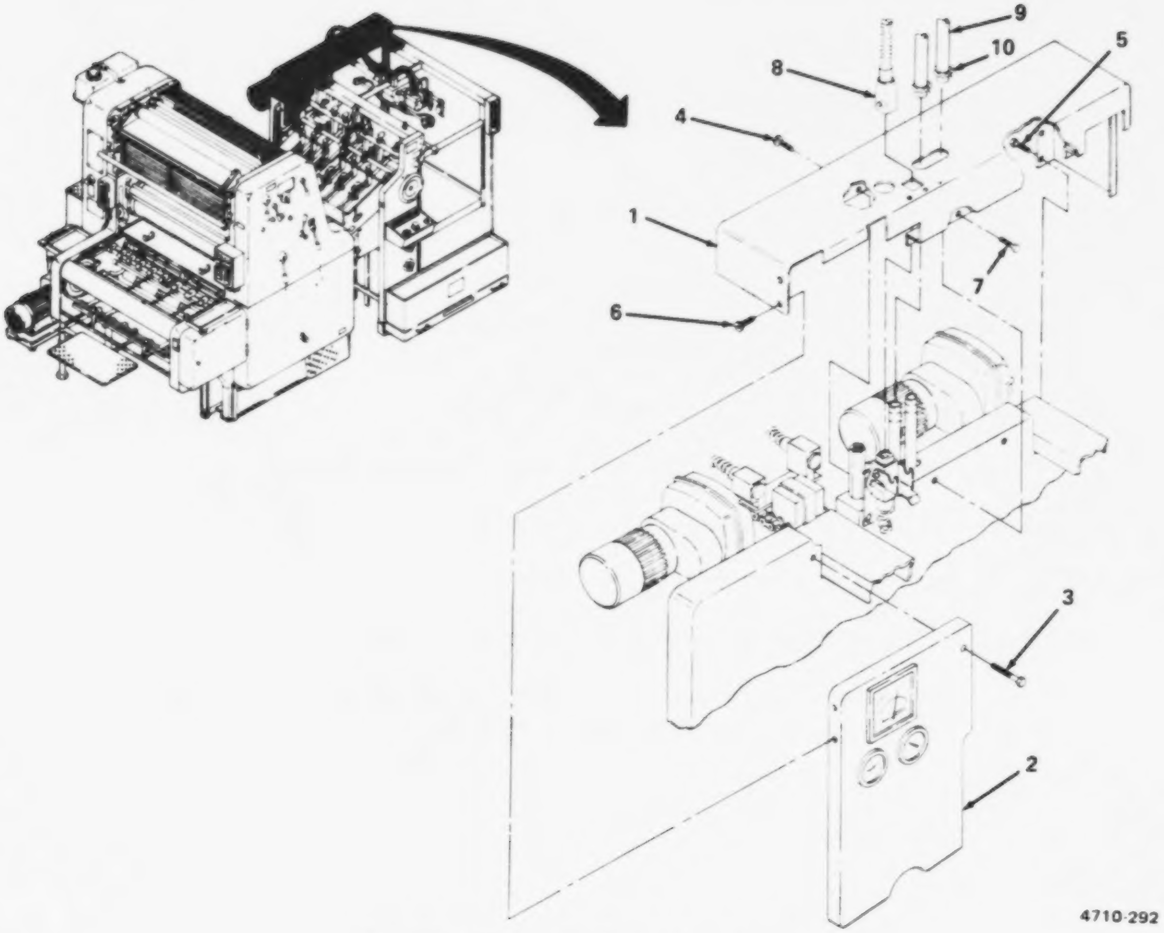
(d) Install four hex-head screws (5) in feeder (D/S).

(e) Install three slotted screws (6) in feeder (press end).

(f) Install two hex-head screws (7) inside feeder.

(g) Install connector (8) and tighten connector clamp.

(h) Install two hoses (9) and tighten hose clamps (10).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6
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4710-292

Figure 2-250. Feeder Guard Installation.

2-89. Pile Lift Control Switches (cont).

d. *Aline.*

(1) *Limit switches.* Aline as described in paragraph 2-16. Actuator for pile limit switches is a wedge or key in main pile lift chain, or auxiliary pile lift chain, that depresses switch plunger 1 mm when upper or lower limit is reached.

(2) *Feeder/delivery pile limit switches.*

NOTE

Feeder pile limit switches and delivery pile limit switch operate reciprocally. All switches must be adjusted so that there is a contact at the high and low switch point.

(a) With power ON, release main pile motor brake by depressing relay d228 on feeder relay panel. Second person: insert screwdriver into end of main pile motor shaft (1) (motor furthest from press section, figure 2-251).

(b) Turn screwdriver clockwise until the switching of the main pile lift limit switch b81 (2) (switch furthest from press section) can be heard.

NOTE

This should occur after three rotations of the motor shaft.

(c) Mark this position of the feeder table on the feeder support.

(d) Turn screwdriver until switch b81 operates again.

(e) Mark this second position of the feed table on the feeder support.

(f) The distance between the two markings should be 6.35 mm (.25 in.). If not, adjust height of limit switch b81 and repeat steps (a) through (e).

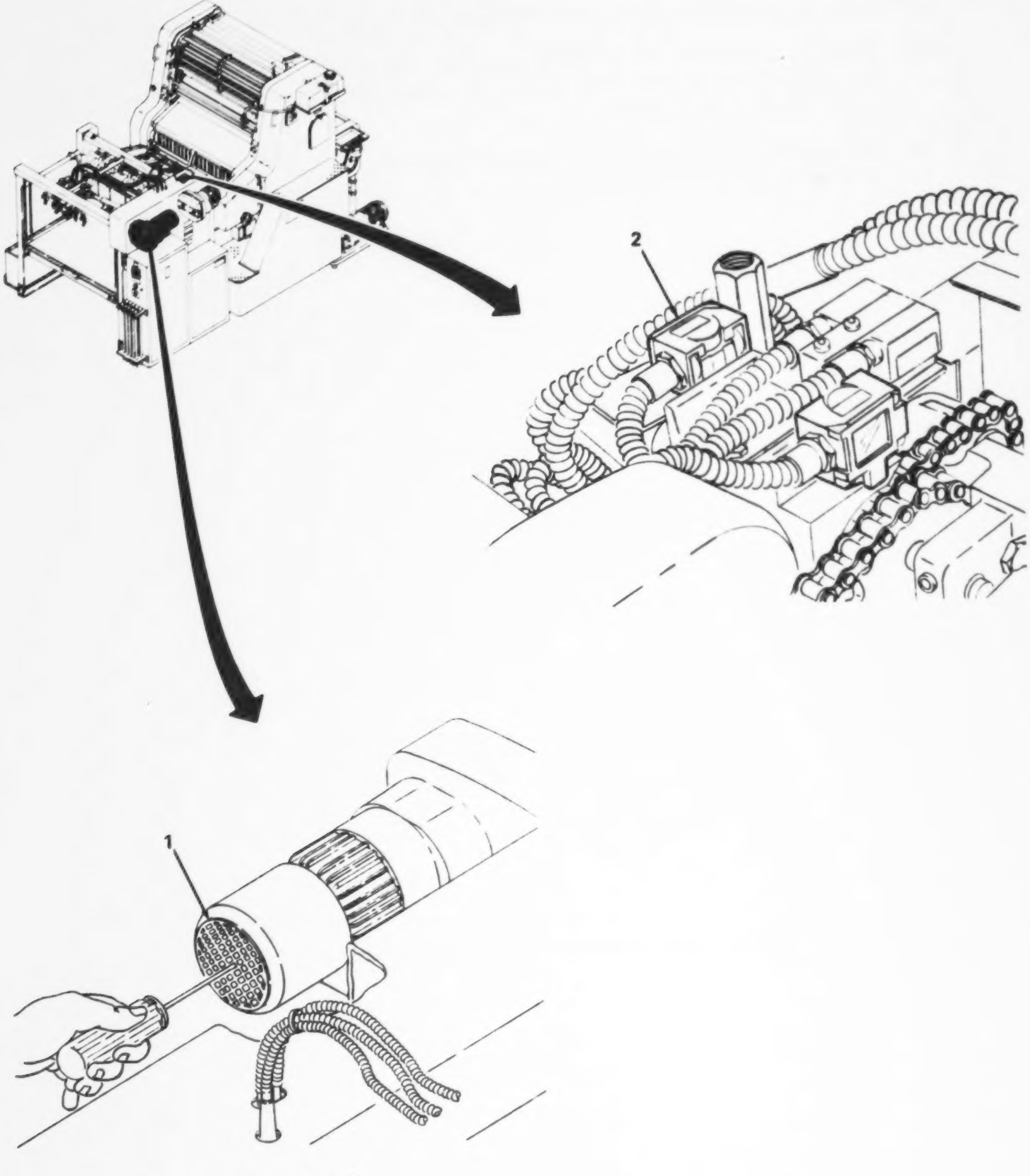

2
1
ROTATED 180°
4710-033

Figure 2-251. Feeder Pile Lift Limit Switch Adjustment.

2-89. Pile Lift Control Switches (cont).

(g) Manually depress plunger of delivery pile limit switch b80 (figure 2-252). The distance between the switch roller and a high point on the ratchet should be 3 mm (.1 in.). If not, adjust switch position.

(h) Adjust feeder auxiliary pile lift motor limit switch following the same procedure of steps (a) through (g), but using relay d226.

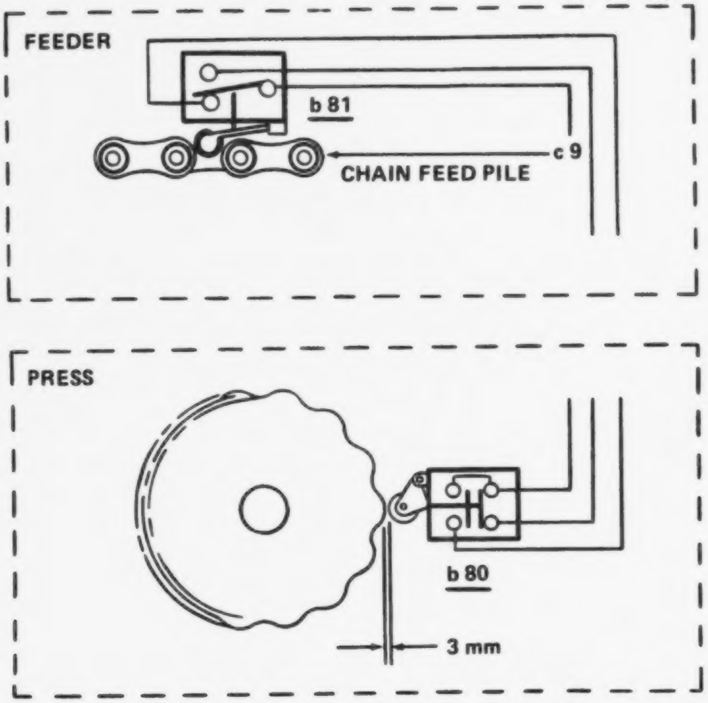

FEEDER
b 81
c 9
CHAIN FEED PILE
PRESS
b 80
3 mm
4710-034

Figure 2-252. Delivery Pile Limit Switch Adjustment.

NOTE

FOLLOW-ON MAINTENANCE:
(1) Install lower guard (O/S) (para. 2-18).
(2) Install main power box panel (para. 2-93).
(3) Install neutralizer bar (para. 2-84).

2-90. Pile Lift Motors, Feeder.

This task covers: a. Test b. Remove c. Repair d. Install

INITIAL SETUP

Tools

5 mm hex key
17 mm combination wrench
0.050 x 0.375 x 8 in. flat-tip screwdriver

Equipment Conditions

Main control box panel removed (para. 2-93)
Feeder guard removed (para. 2-89)

Additional Personnel Requirement

Electrician MOS 35E20

a. Test. Test operation of main pile lift motor (Troubleshooting, para. 2-10). Repeat text procedure for auxiliary pile lift motor (Troubleshooting, para. 2-10).

b. Remove. (figure 2-253)

WARNING

When working on high voltage components, keep one hand away from equipment to reduce hazard of current flowing through vital organs of body. Remove all jewelry from fingers, wrists, and neck prior to working on electrical components. Failure to do so may result in death or serious burns.

NOTE

Procedure is for main pile lift motor. Procedure for auxiliary pile lift motor is the same.

(1) With power ON, release main pile motor brake by depressing relay d228 on feeder relay panel. Second person: insert screwdriver through motor cover into end of main pile motor shaft (motor furthest from press section).

(2) Turn screwdriver clockwise until the master link on pile lift chain is accessible.

(3) Turn power OFF.

(4) Remove four slotted screws (1), washers (2), cover (3), and terminal box (4).

(5) Remove three hex nuts (5) and tag and remove three blue leads (6).

(6) Break pile chain (7) at master link and remove chain.

WARNING

Equipment exceeds 35 pounds. Second person must support equipment while performing steps (7) and (8).

(7) Remove hex-head bolt (8) and washer (9) (washer not on auxiliary motor).

(8) Remove two hex-head bolts (10), four washers (11), and pile lift motor (12).

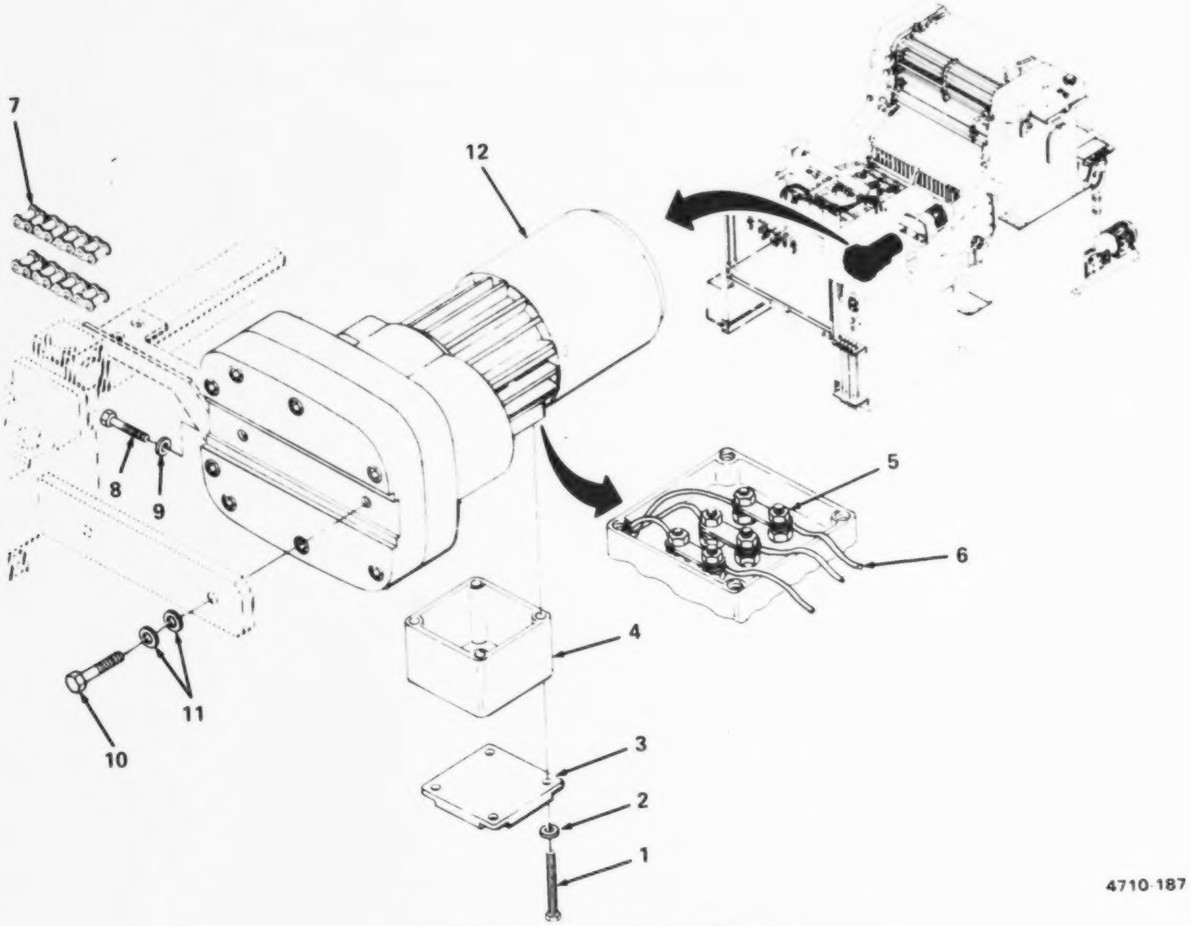


Figure 2-253. Pile Lift Motor Removal.

2-90. Pile Lift Motors, Feeder (cont).

c. *Repair.* (figure 2-254)

(1) Remove three slotted pan-head screws (1) and cover (2).

(2) Remove fan (3).

(3) Remove two hex nuts (4), washers (5), and tag and remove clutch leads (6).

(4) Remove three socket-head screws (7), washers (8), and magnetic clutch (9).

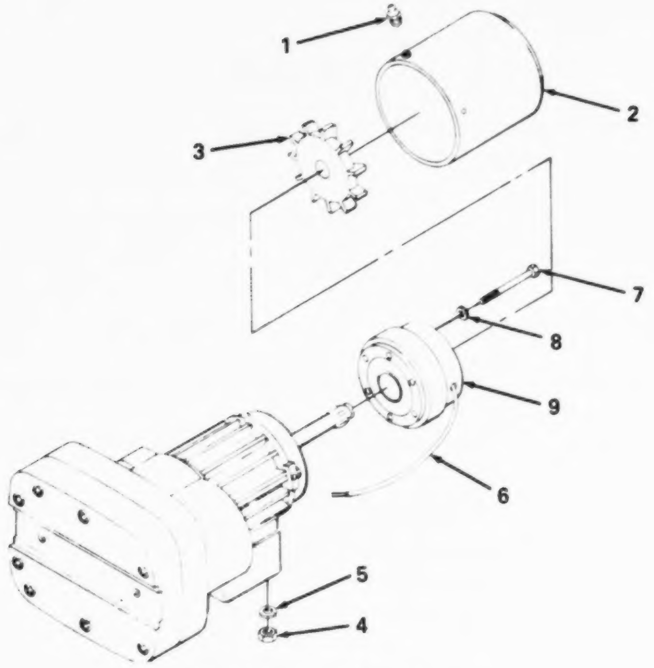
(5) Replace malfunctioning magnetic clutch (9).

(6) Replace magnetic clutch (9), three socket-head screws (7), and washers (8).

(7) Replace tagged clutch leads (6), two hex nuts (4), and washers (5). Remove tags.

(8) Replace fan (3).

(9) Replace cover (2) and three slotted pan-head screws (1).



4710-188

Figure 2-254. Pile Lift Motor Repair.

2-90. Pile Lift Motors, Feeder (cont).

d. *Install.* (figure 2-255)

WARNING

Equipment exceeds 35 pounds. Second person must support equipment while performing steps (1) and (2).

(1) Install pile lift motor (1), four washers (2), and two hex bolts (3).

(2) Install washers (4) and hex-head bolt (5).

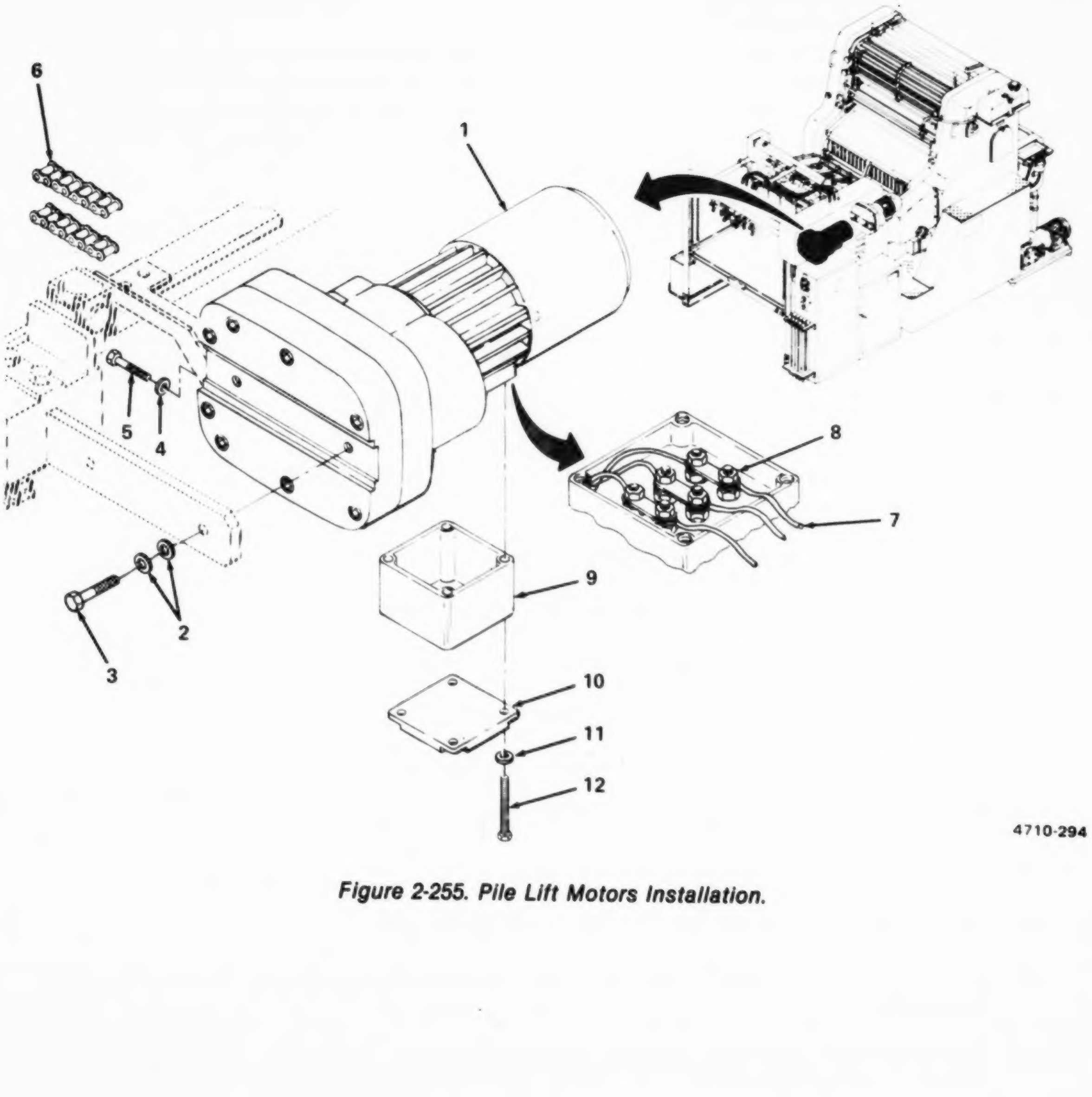
(3) Install pile chain (6) and connect chain ends at master link.

(4) Replace three tagged blue leads (7) and terminal hex nuts (8). Remove tags.

(5) Replace terminal box (9), cover (10), four washers (11), and slotted screws (12).

NOTE

FOLLOW-ON MAINTENANCE:
(1) Install feeder guard (para. 2-89).
(2) Install main control box panel (para. 2-93).
(3) Adjust feeder chain timing (para. 2-96).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4710-294

Figure 2-255. Pile Lift Motors Installation.

2-91. Compressor.

This task covers: a. Test b. Replace c. Repair

INITIAL SETUP

Tools

0.050 x 0.375 x 8 in. flat-tip screwdriver
1.0 x 6.0 x 0.5 mm flat-tip screwdriver
No. 2 x 4 inch cross-tip screwdriver
No. 3 x 6 inch cross-tip screwdriver
8 mm combination wrench
19 mm combination wrench
3 mm hex key

Additional Personnel Requirement

Electrician MOS 35E20

General Safety Instructions

WARNING

Hazardous electrical voltages exist within printing press. Do not connect or disconnect any electrical components while power is on. Death, serious electrical shock, or burns may result.

---

a. *Test.* Test performance as described in troubleshooting, para. 2-10.

b. *Replace.* (figure 2-256)

NOTE

Procedure is for oil lubricated compressor. Procedure for dry (oilless) compressor is identical.

(1) Loosen four hose clamps (1) and remove hoses (2).

(2) Remove four slotted screws (3), cover (4), and terminal box (5).

(3) Remove three terminal hex nuts (6) and tag and remove black leads (7).

(4) Remove one cross-head screw (8) and cover (9).

(5) Loosen two slotted screws (10) and tag and remove two leads (11).

(6) Remove four fat-head screws (12), flat washers (13), and lockwashers (14).

(7) Slide compressor (15) out and turn it on its side.

(8) Remove four cross-head screws (16), and mounting plate (17).

(9) With compressor (15) turned on its side, install mounting plate (17) and four cross-head screws (16).

(10) Turn compressor (15) so that mounting plate (17) is down and slide compressor into position next to press.

(11) Install four lockwashers (14), flat washers (13), and flat-head screws (12).

(12) Install tagged leads (11) and tighten two slotted screws (10). Remove tags.

(13) Install cover (9) and one cross-head screw (8).

(14) Install tagged black leads (7) and three terminal nuts (6). Remove tags.

(15) Install terminal box (5), cover (4), and four slotted screws (3).

(16) Install four hoses (2) and tighten hose clamps (1).

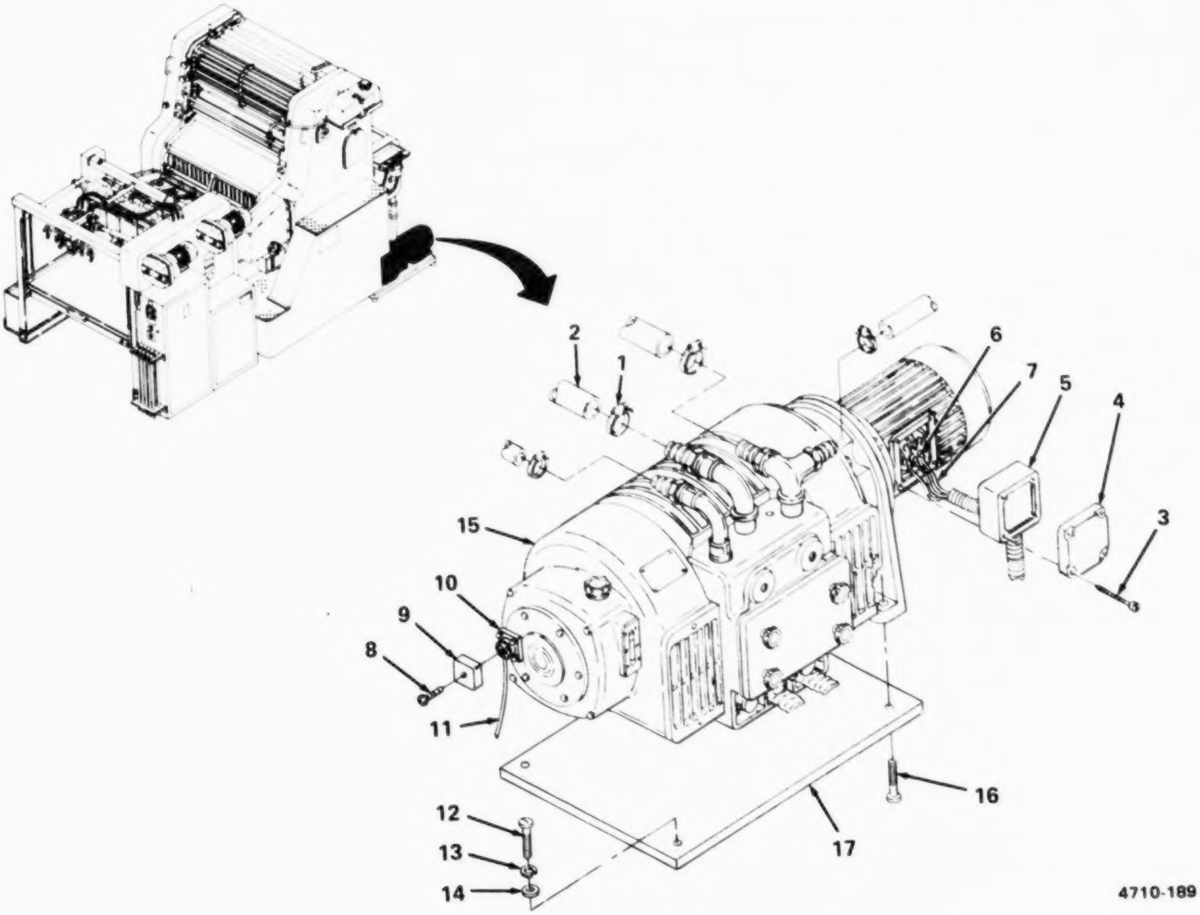


Figure 2-256. Compressor Replacement.

2-91. Compressor (cont).

c. *Repair.* (figure 2-257)

(1) Remove nipple (1), angle piece (2), and reducer (3).

(2) Remove nipple (4) and guide piece (5).

(3) Remove two nipples (6) and twin nipple guide piece (7).

(4) Remove oil fill plug (8) and gasket (9) (oil lubricated model only).

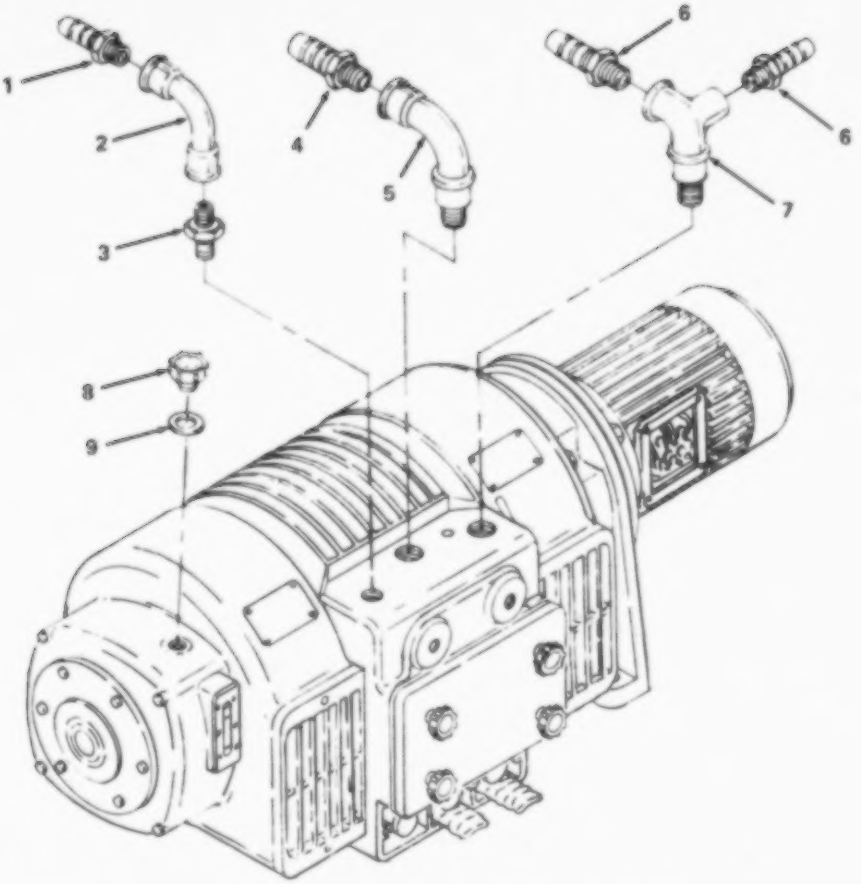
(5) Replace damaged components. Replace missing or damaged oil fill plug (8). Replace dry or compressed gasket (9).

(6) Replace oil fill plug (8) and gasket (9).

(7) Replace twin nipple guide piece (7) and two nipples (6).

(8) Replace guide piece (5) and nipple (4).

(9) Replace reducer (3), angle piece (2), and nipple (1).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4710-190

Figure 2-257. Compressor Repair.

2-92. Electronic Control Box.

This task covers: Replace

INITIAL SETUP

Tools

0.050 x 0.375 x 8 in. flat-tip screwdriver

Replace. (figure 2-258)

(1) Tag and remove timing disc lead (1).

(2) Tag and remove three connecting leads to sensors (2).

(3) Remove connector at terminal (3)

(4) Remove two slotted screws (4) and washer (5).

(5) Remove and replace electronic control box (6).

(6) Install electronic control box (6), two washers (5), and slotted screws (4).

(7) Install connector at terminal (3).

(8) Install three connecting leads from sensors (2) and remove tags.

(9) Install timing disc lead (1) and remove tag.

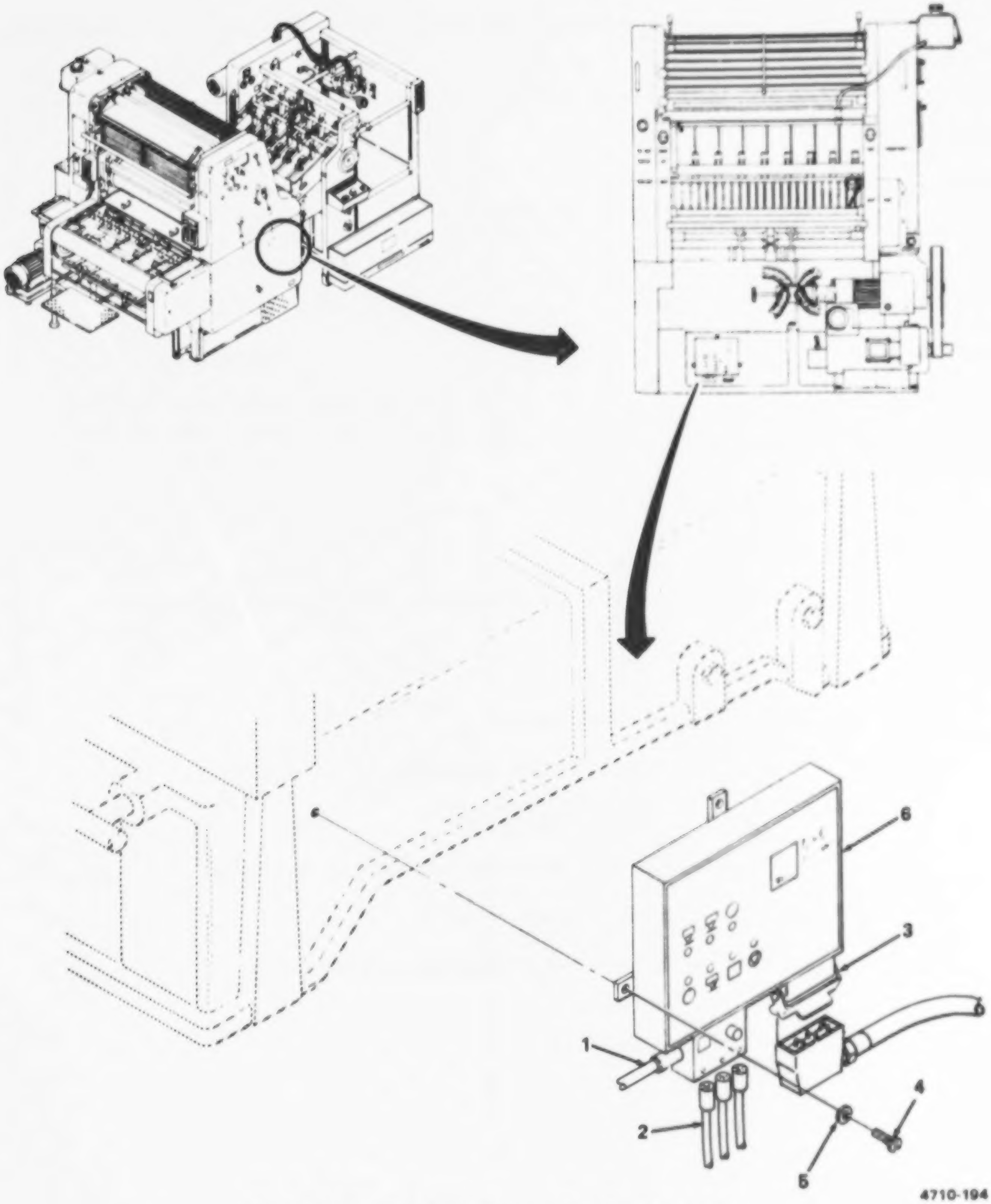

6
3
1
2
5
4
4710-194

Figure 2-258. Electronic Control Box Replacement.

2-93. Main Control Box.

This task covers: a. Remove b. Repair c. Install

INITIAL SETUP

Tools

Wrench (00.780.0854)
10 mm combination wrench
12 mm combination wrench
0.046 x 0.3125 x 6 inch flat-tip screwdriver
No. 3 x 6 inch cross-tip screwdriver
Fuse extractor

Equipment Conditions

Main circuit breaker for press OFF
(TM 5-3610-287-10)

Additional Personnel Requirement

Electrician MOS 35E20
Printing and Binding Specialist MOS 83F20

General Safety Instructions

WARNING

Shut off power source before attempting to disconnect, service, or connect wires or cables. Failure to do so may result in death or serious injury.

a. Remove. (figure 2-259)

(1) Ensure main switch (1) is in OFF position. Disconnect main power cable from power source.

(2) Remove door panels (2).

(3) Tag and remove cables and wiring harnesses.

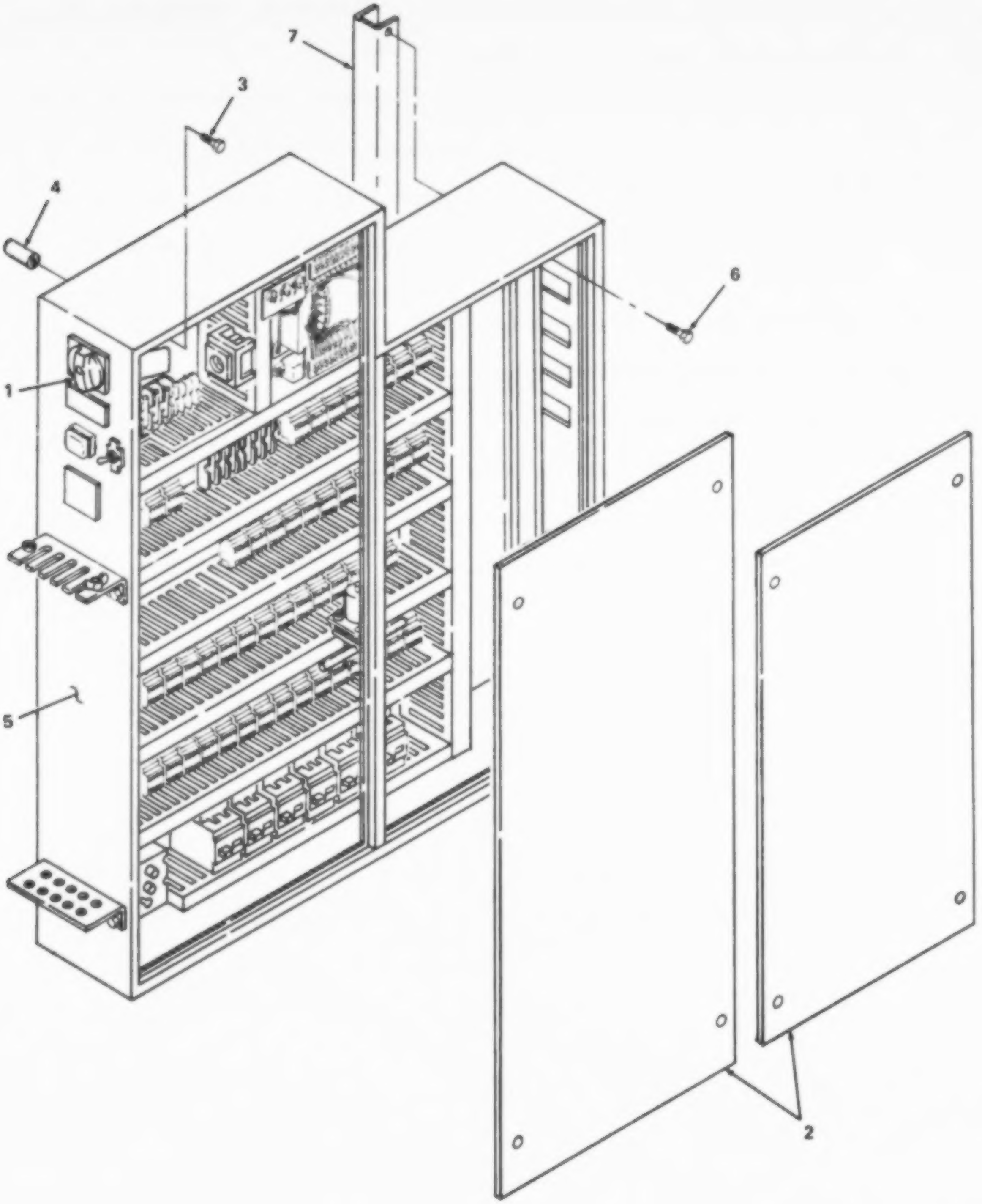
(4) Remove five hex-head screws (3) and three spacers (4).

WARNING

Main control box exceeds 35 pounds. Use two persons to remove.

(5) Remove control box (5) from feeder frame.

(6) Remove two hex screws (6) from inside of feeder frame and bracket (7).



7
3
4
6
1
5
2
4710-303

Figure 2-259. Main Control Box Removal.

2-93. Main Control Box (cont).

b. *Repair.*

(1) *Bar-lock electromagnet.* (figure 2-260).

(a) Tag and remove wires.

(b) Remove two hex nuts (1) and washer (2).

(c) Remove four pan-head screws (3) and hex nuts (4).

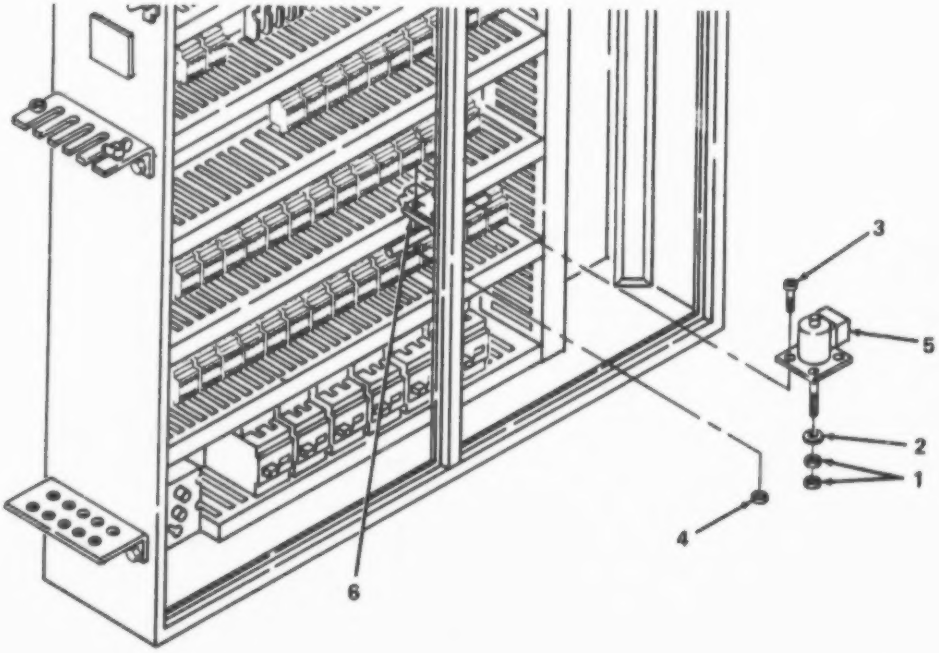
(d) Remove electromagnet (5) from T-bar bracket (6).

(e) Install wires, remove tags.

(f) Install electromagnet (5) on t-bar bracket (6).

(g) Install four pan-head screws (3) and hex nuts (4).

(h) Install washer (2) and two hex nuts (1).



4710-304

Figure 2-260. Bar Lock Repair.

(2) *Fuse carriers.* (figure 2-261).

NOTE

Removal procedures for all four fuse carriers are the same.

(a) Remove fuse (1) from fuse carrier (2).

(b) Identify and tag wires (4) to be removed.

(c) Loosen set screws (3), remove wires (4).

(d) Remove screws (5) and fuse carrier (2) from control box.

(e) Install fuse carrier (2) and screws (5).

(f) Install wires (4) and tighten set screws (3). Remove tags.

(g) Install fuse (1) in fuse carrier (2).

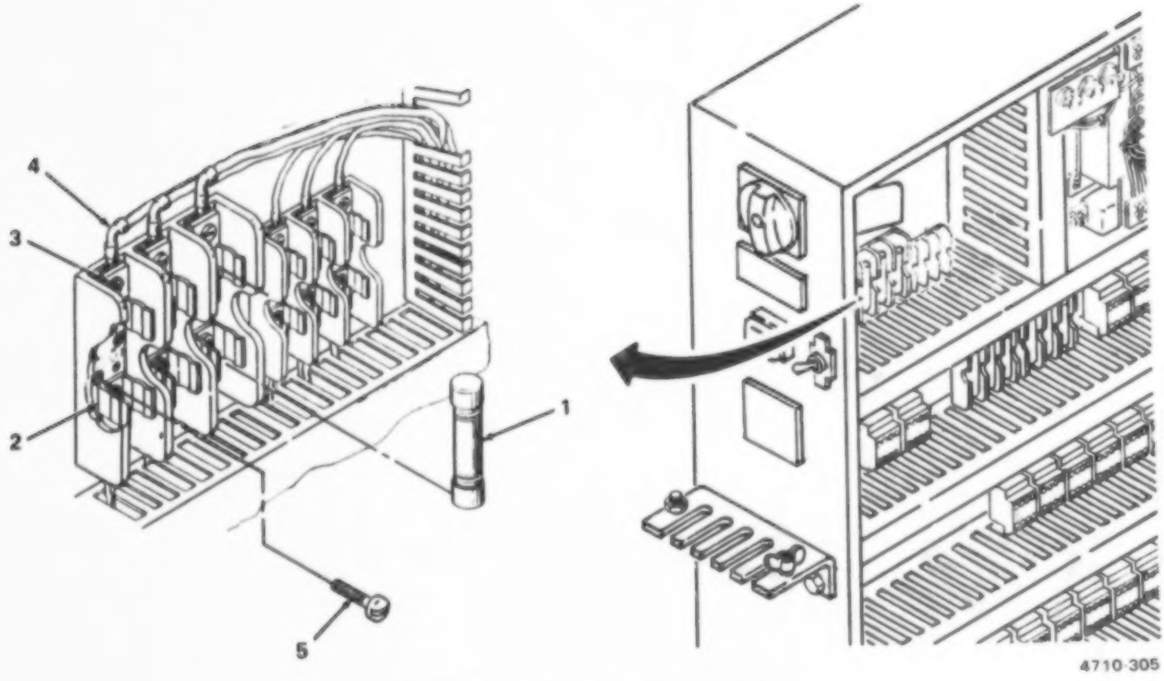


Figure 2-261. Fuse Carrier Repair.

2-93. Main Control Box (cont).

(3) *Rectifier.* (figure 2-262)

(a) Tag and remove wires (1) on rectifier (2).

(b) Remove screw (3) and rectifier (2).

(c) Install rectifier (2) and screw (3).

(d) Install wires (1), remove tags.

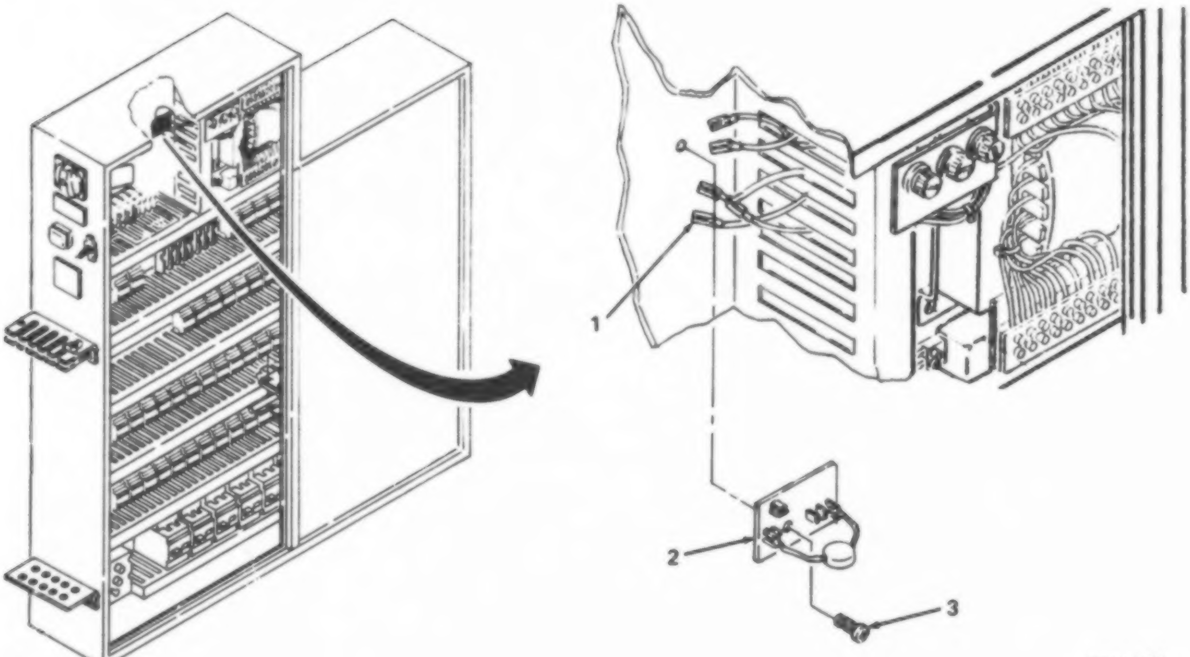


Figure 2-262. Rectifier Repair.

(4) *Inductive ballast.* (figure 2-263)

(a) Tag wires (1) to be removed. Loosen screws (2), remove wires (1).

(b) Remove two screws (3), and ballast (4).

(c) Install ballast (4) and two screws (3).

(d) Install wires (1) and tighten screws (2). Remove tags.

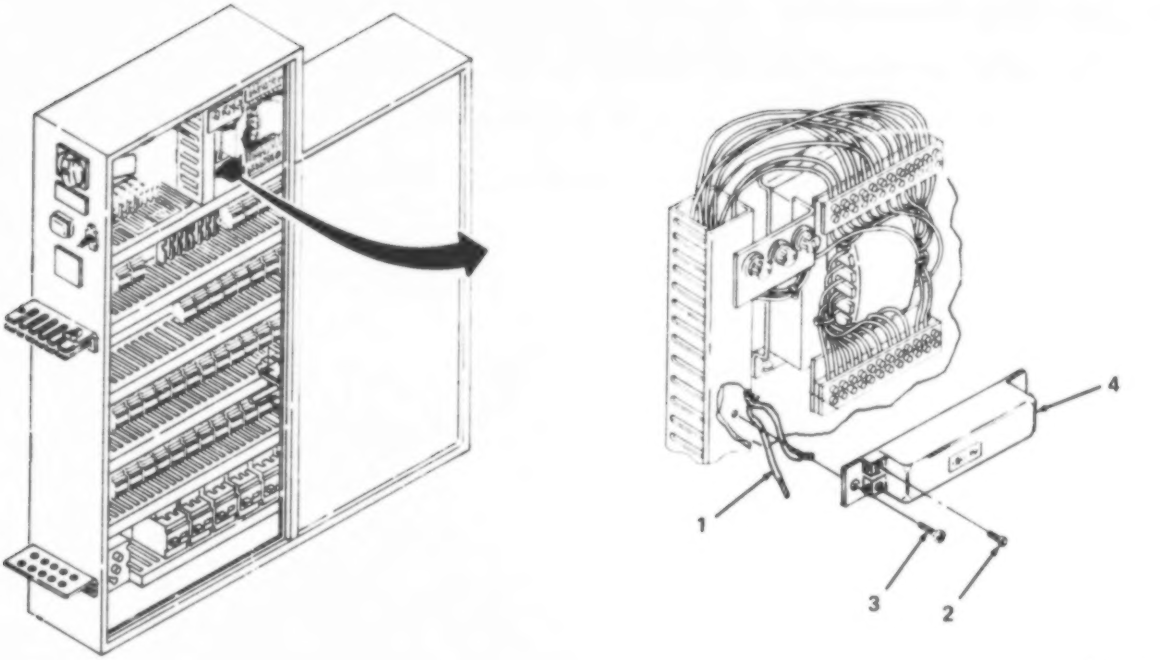


Figure 2-263. Inductive Ballast Repair.

2-93. Main Control Box (cont).

(5) *Transformer.* (figure 2-264)

(a) Tag wires (1) to be removed from transformer (2) and fuse holder (3).

(b) Loosen screws (4) on transformer (2) and remove wires (1).

(c) Remove four screws (5), washers (6), and transformer (2).

(d) Remove wires (7) from fuse holder (3).

(e) Remove screws (8) and fuse holder (3).

(f) Install fuse holder (3) and screw (8) on transfomer (2).

(g) Install transformer (2), four washers (6), and screws (5).

(h) Install wires (1) in fuse holder (3) and transformer (2). Tighten screws (4). Remove tags.

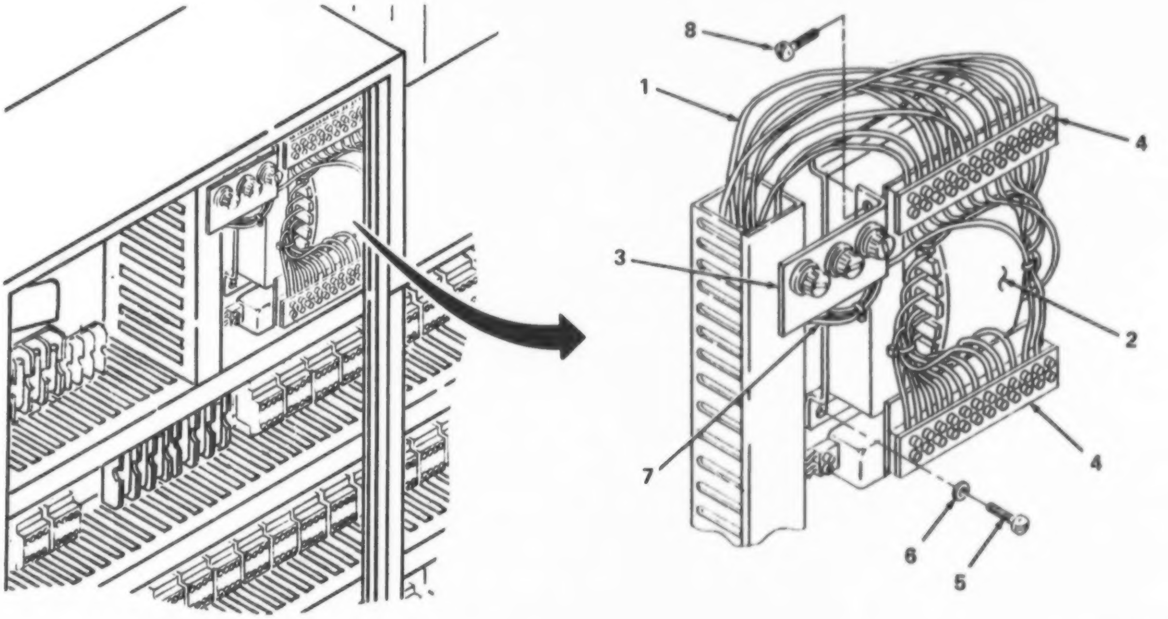


Figure 2-264. Transformer Repair.

(6) *Relays and motor protection switches.* (figure 2-265)

(a) Tag wiring (1) on relay or switch (2), loosen screw (3), and remove wires (1).

(b) Insert flat-tip screwdriver in locking device (4) and push down.

(c) Remove relay (2) from support strip (5) by pivoting up and out. Remove screwdriver.

(d) Aline relay (2) with support strip (5).

(e) Insert screwdriver in locking device (4) and push down.

(f) Pivot base of relay or switch on to support strip (5). Release locking device (4) and remove screwdriver.

(g) Install wires (1), tighten screws (3), and remove tags.

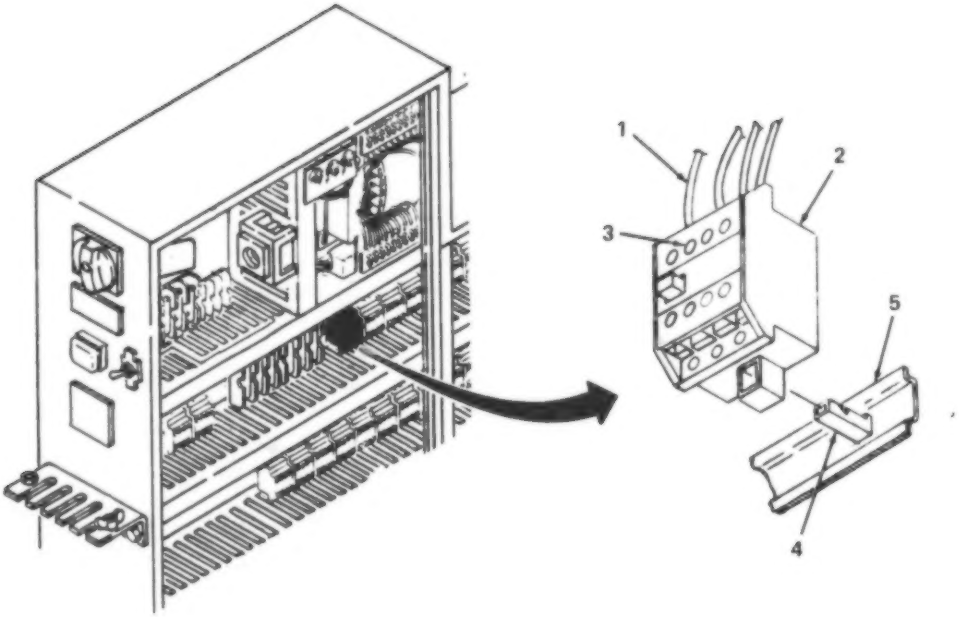


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Figure 2-265. Relay and Motor Protection Switch Repair.

2-93. Main Control Box (cont).

(7) *Main motor protection switch.* (figure 2-266)

(a) Remove two screws (1) and cover (2).

(b) Tag wires to be removed (3), loosen screws (4), and remove wires (3).

(c) Remove two screws (5) and motor protection switch (6).

(d) Install motor protection switch (6) and two screws (5).

(e) Install wires (3) and tighten screws (4). Remove tags.

(f) Install cover (2) and screws (1).

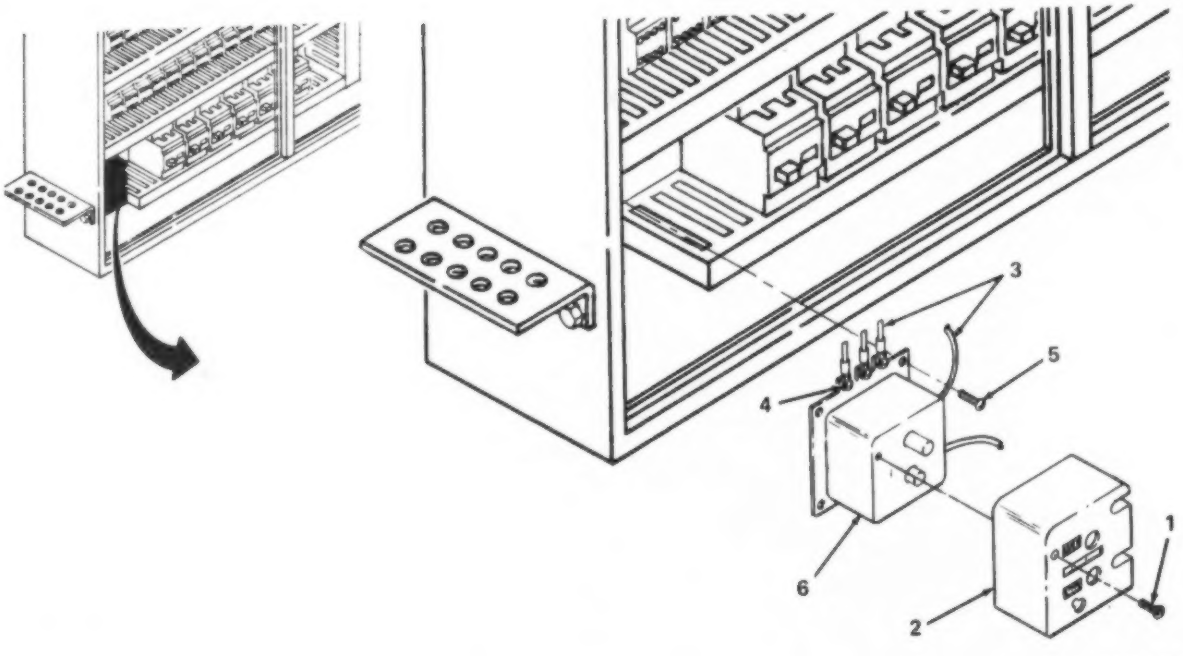


Figure 2-266. Main Motor Protection Switch Repair.

(8) ***Main switch.*** (figure 2-267)

(a) Remove screw (1) and knob (2).

(b) Remove two screws (3), on/off plate (4), and back plate (5).

(c) Remove four screws (6), hex nuts (7), star washers (8), and placard (9). Switch (10) can be moved to a position where wires (11) will be accessible.

(d) Tag wires (11), remove hex nuts (12) and wires (11).

(e) Install wires (11) and hex nuts (12). Remove tags.

(f) Install switch (10), placard (9), screws (6), star washers (8), and hex nuts (7).

(g) Install back plate (5), on/off plate (4), and two screws (3).

(h) Install knob (2) and screw (1).

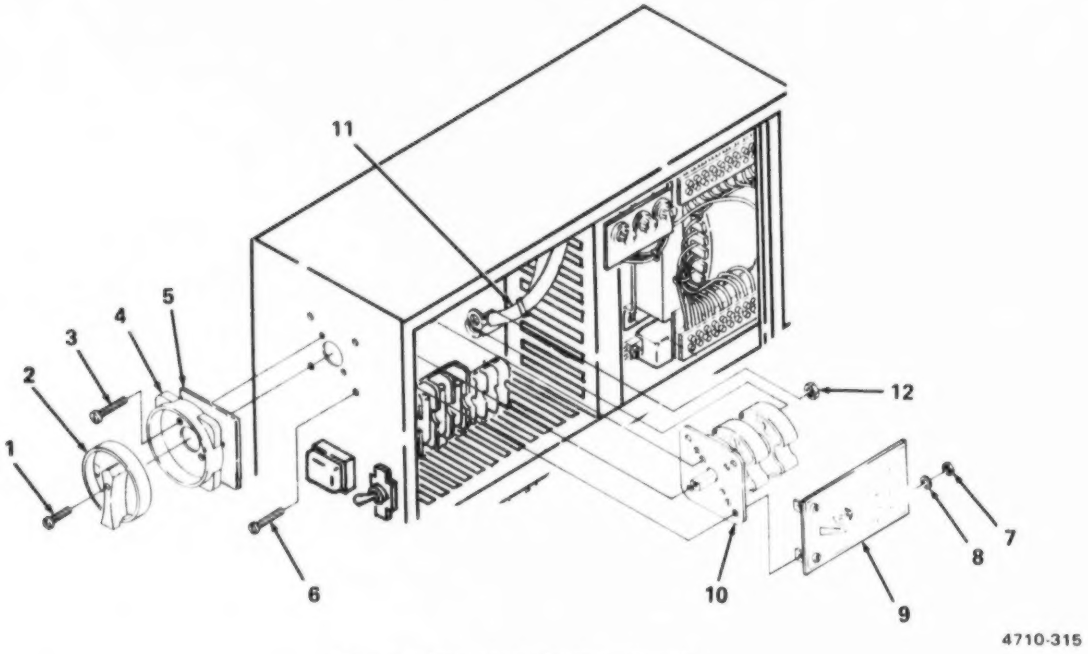


Figure 2-267. Main Switch Repair.

2-93. Main Control Box (cont).

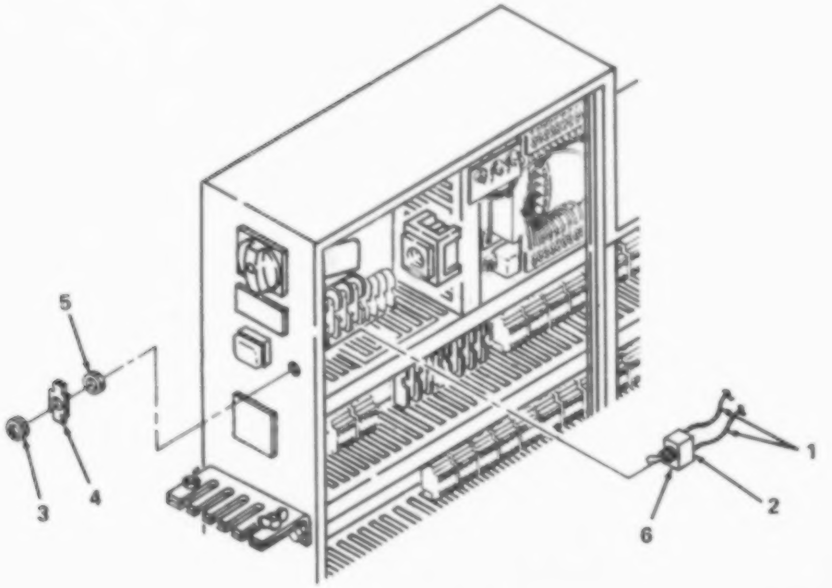
(9) *Toggle switch.* (figure 2-268)

(a) Tag wires (1). Loosen two screws (2) and remove wires (1).

(b) Remove knurled nut (3), on/off plate (4), lock nut (5), and toggle switch (6).

(c) Install toggle switch (6), lock nut (5), on/off plate (4), and nut (3).

(d) Install wires (1), tighten screws (2). Remove tags from wires.



4710-311

Figure 2-268. Toggle Switch Repair.

(10) *Indicator light.* (figure 2-269)

(a) Identify and tag wires (1). Loosen screws (2) and remove wires (1).

(b) Remove retaining clip (3), plastic nut (4), lens (5), lens holder (6), and socket (7).

(c) Remove lamp (8) from socket (7).

(d) Install lamp (8) in socket (7).

(e) Install plastic nut (4), socket (7), lens holder (6), and lens (5).

(f) Tighten plastic nut (4) and install retaining clip (3).

(g) Install wires (1), tighten screws (2), and remove tags.

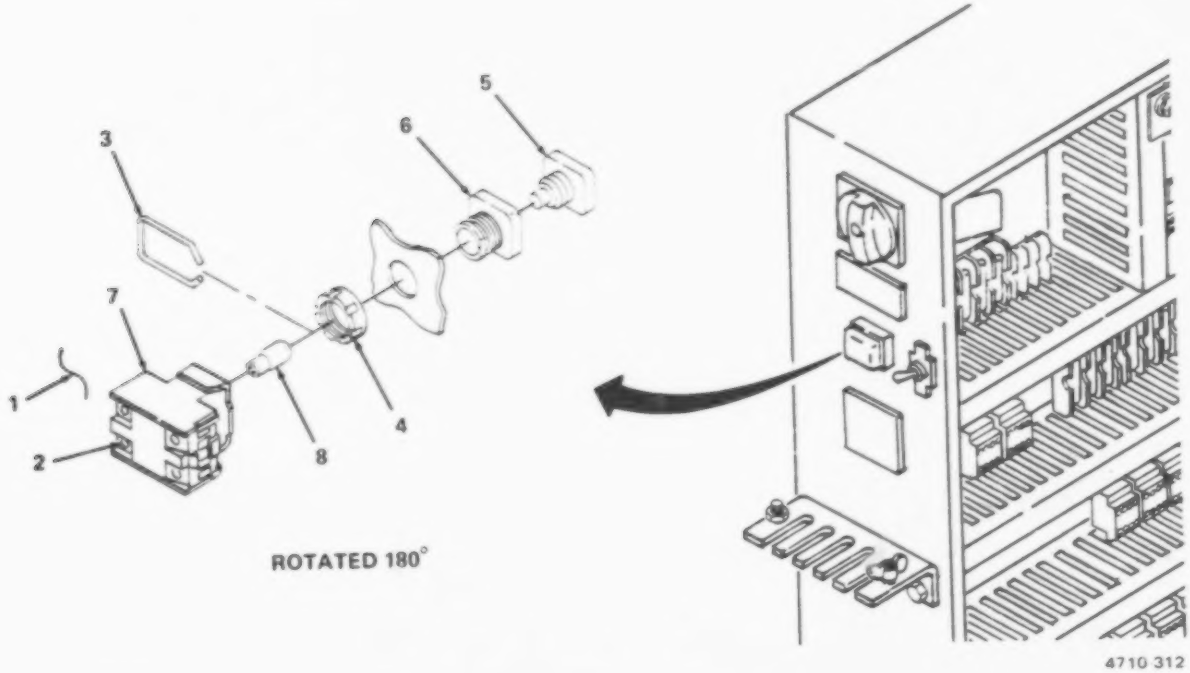


Figure 2-269. Indicator Light Repair.

2-93. Main Control Box (cont).

(11) *Fixing bar.* (figure 2-270)

(a) Tag and remove wiring.

(b) Remove two cross-tip screws (1) from support bracket (2), and remove fixing bar (3).

(c) Install fixing bar (3) on support bracket (2) and install cross-tip screw (1).

(d) Install wiring and remove tags.

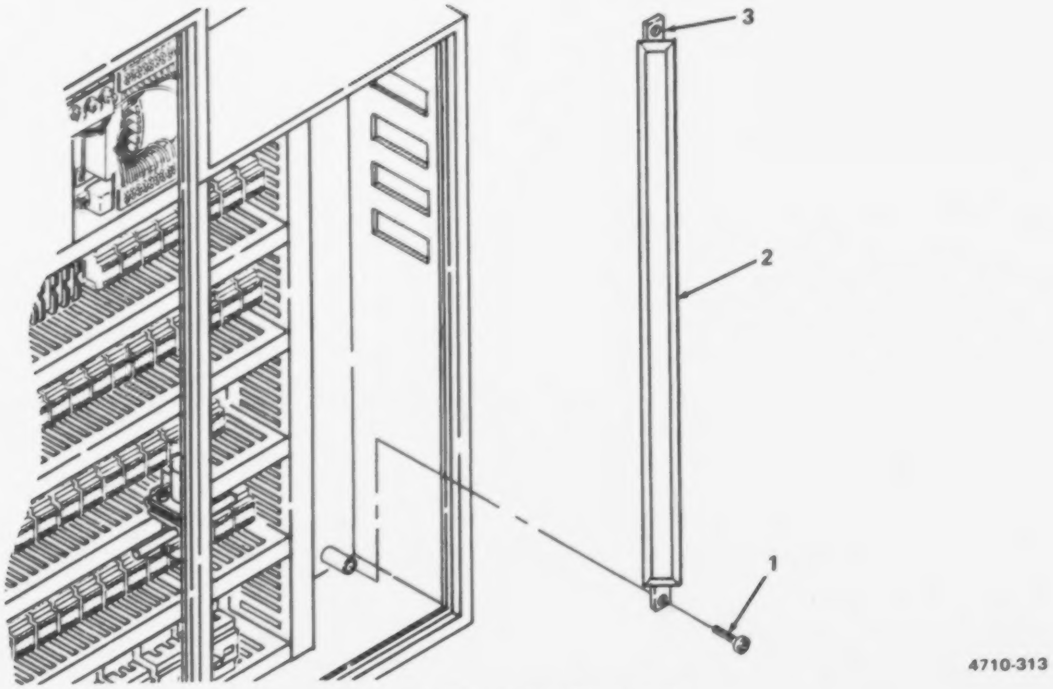


Figure 2-270. Fixing Bar Repair.

(12) *Rod holder.* (figure 2-271)

(a) Remove four hex screws (1), lockwashers (2), lower rod holder (3), and upper rod holder bracket (4).

(b) Remove wing nut (5), hex nut (6), lockwasher (7), two washers (8), and locking plate (9).

(c) Install locking plate (9), two washers (8), lock washer (7), hex nut (6), and wing nut (5).

(d) Install upper rod bracket (4), lower rod holder (3), four washers (2), and hex screws (1).

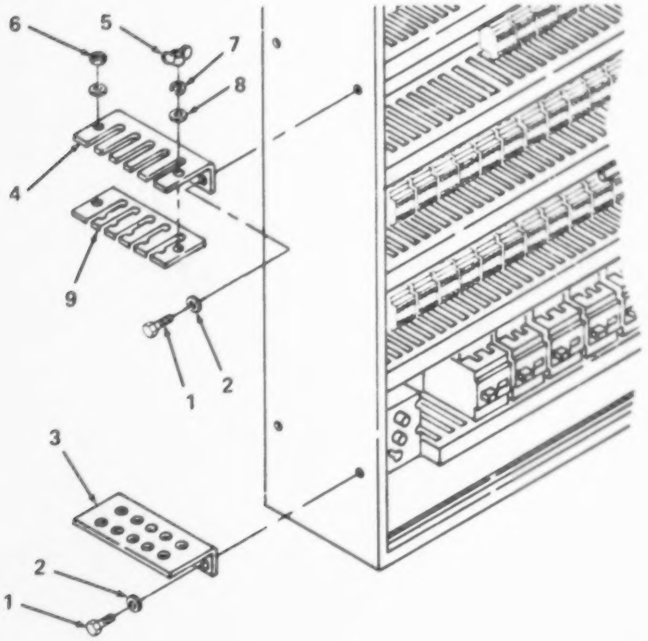


Figure 2-271. Rod Holder Assembly Repair.

2-93. Main Control Box (cont).

c. *Install.* (figure 2-272)

(1) Install bracket (1) and hex screws (2) on feeder frame.

(2) Install control box (3), spacer (4), and hex screws (5).

(3) Install wiring and cables and remove tags.

(4) Install door panels (6).

NOTE

FOLLOW-ON MAINTENANCE:
Connect main power cable to power source.

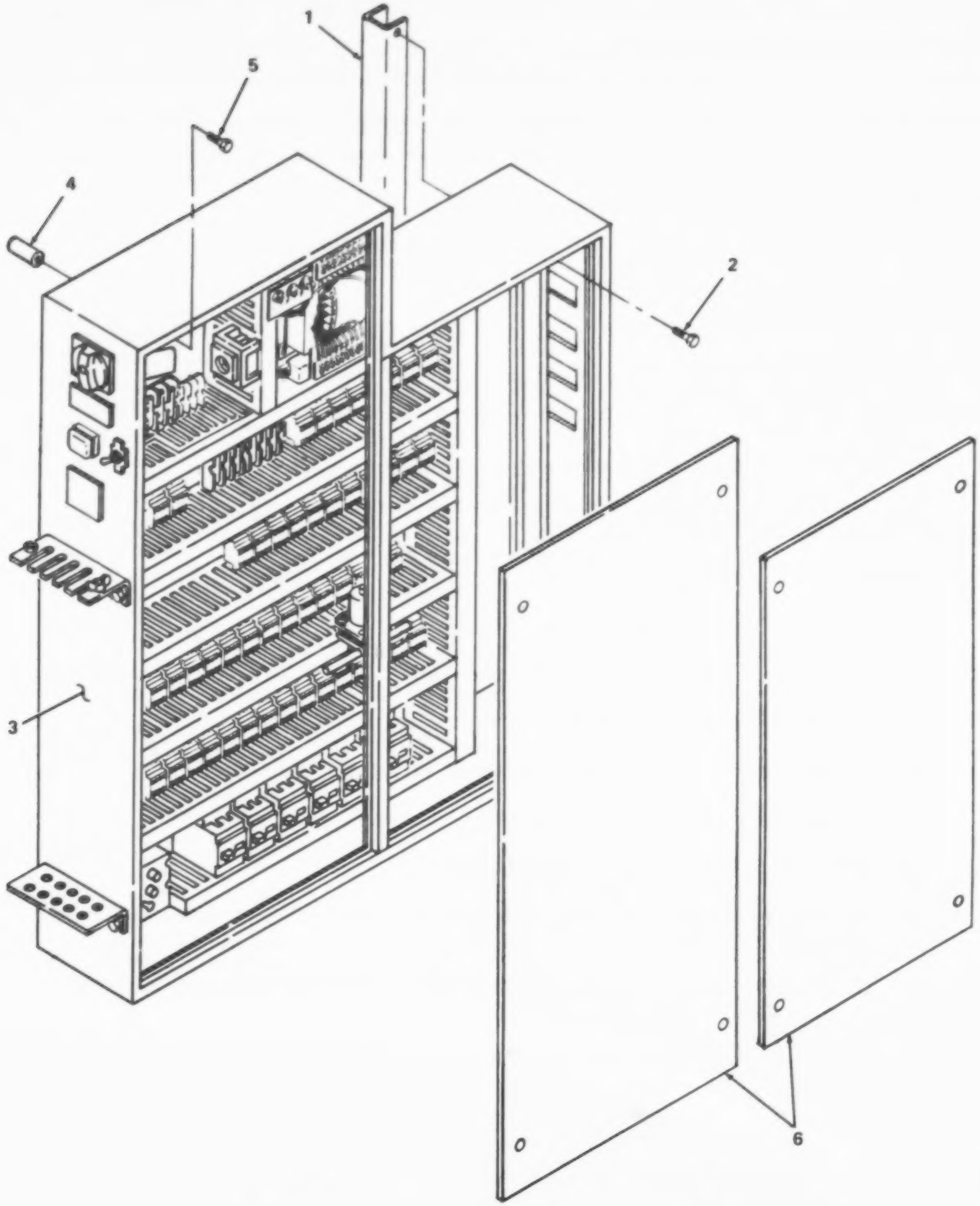


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Figure 2-272. Main Control Box Installation.

2-94. Auxiliary Control Boxes.

This task covers: a. Test b. Replace c. Repair

INITIAL SETUP

Tools

0.046 x 0.313 x 6 in. flat-tip screwdriver
No. 3 x 6 in. cross-tip screwdriver

Additional Personnel Requirement

Electrician MOS 35E20

General Safety Instructions

WARNING

Hazardous electrical voltages exist within printing press. Do not connect or disconnect any electrical components while power is on. Death, serious electrical shock, or burns may result.

a. *Test.* Malfunctioning switches, lamps and the sheet counter can be located by use of troubleshooting procedures given in table 2-5.

b. *Replace.*

(1) *Press unit control boxes.* (figure 2-273)

(a) Remove four cross-head screws (1) and washers (2).

(b) Separate auxiliary feeder control with sheet counter panel (3) from box (4).

(c) Tag and remove leads to all panel components and remove panel (3).

(d) Remove four cross-head screws (5) and control box (4).

(e) Remove four slotted screws (6) and washers (7).

(f) Tag and remove leads to all panel components and remove auxiliary press unit/safety stop control panel (8).

(g) Install tagged leads to all panel components and install auxiliary press unit/safety stop control panel (8). Remove tags.

(h) Install four washers (7) and four slotted screws (6).

(i) Install control box (4) and four cross-head screws (5).

(j) Install tagged leads to all panel components (3) and install auxiliary feeder control with sheet counter panel (3) in box (4). Remove tags.

(k) Install four washers (2) and four cross-head screws (1).

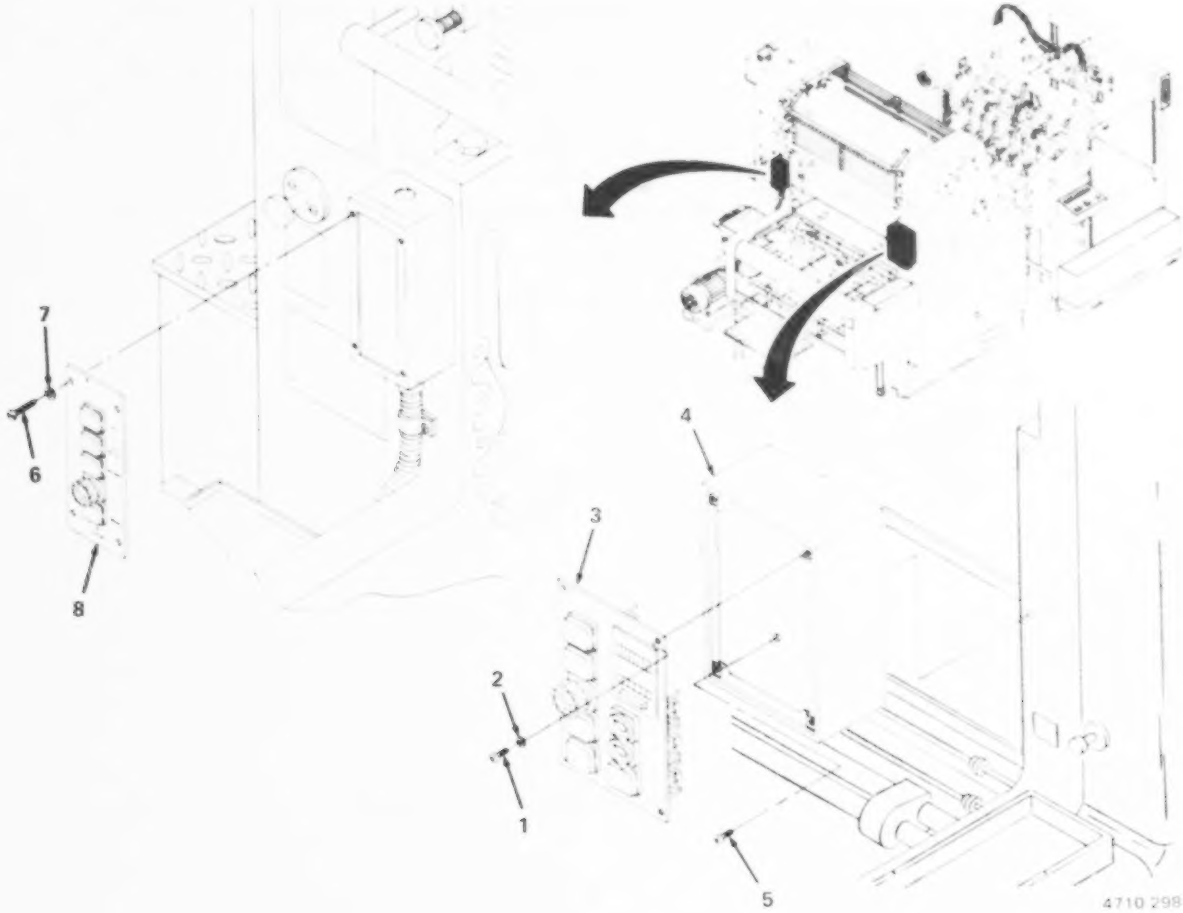


Figure 2-273. Press Unit Control Boxes Replacement.

2-94. Auxiliary Control Boxes (cont).

(2) *Feeder unit boxes.* (figure 2-274)

(a) Remove four slotted screws (1) and washers (2) and lift out panel (3).

(b) Tag and remove leads from all components and remove main operator's control panel (3).

(c) Remove four slotted screws (4) and four washers (5).

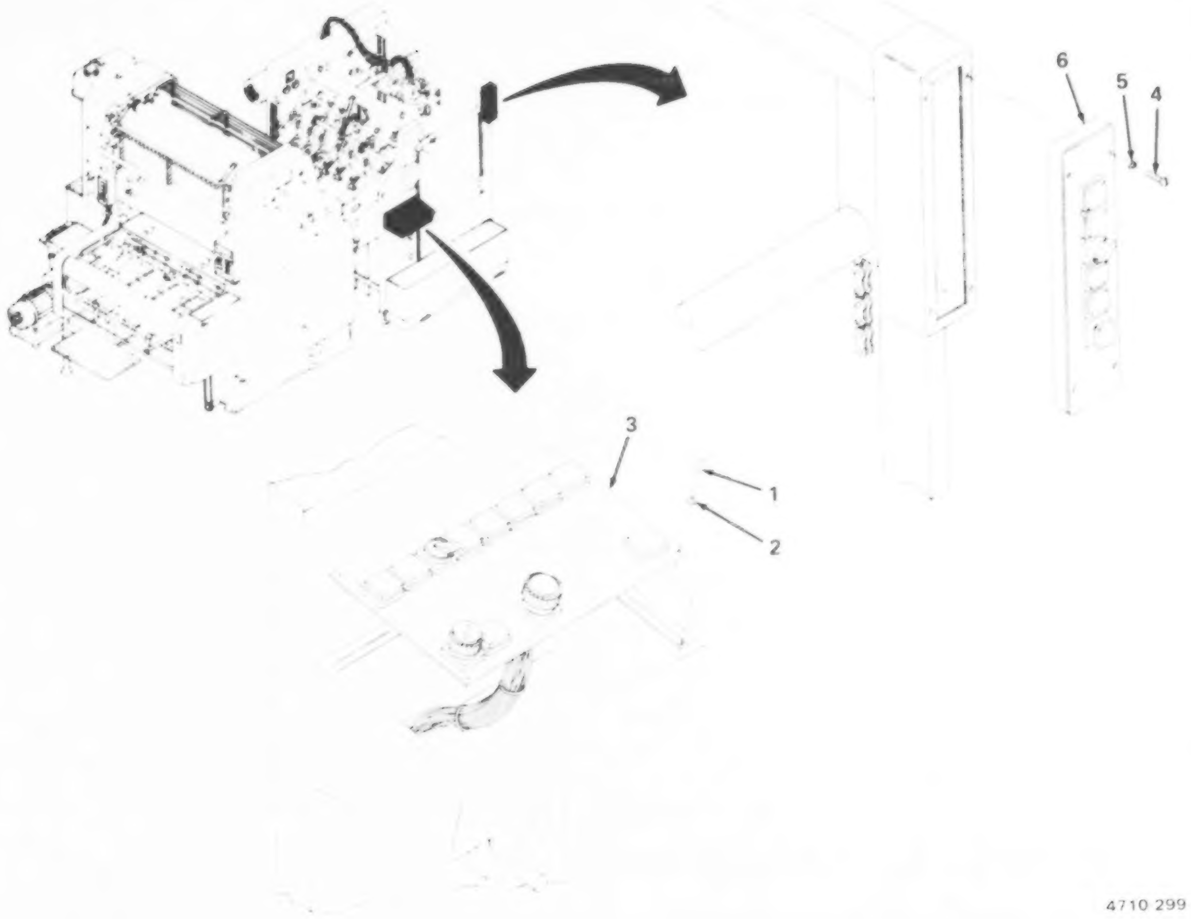
(d) Tag and remove leads from all components and remove feeder pile control panel (6).

(e) Install tagged leads to all panel components and install feeder pile control panel (6). Remove tags.

(f) Install four washers (5) and four slotted screws (4).

(g) Install tagged leads to all panel components and install main operator's control panel (3). Remove tags.

(h) Install four washers (2) and four slotted screws (1).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1
2
4710 299

Figure 2-274. Feeder Unit Control Boxes Replacement.

2-94. Auxiliary Control Boxes (cont).

c. *Repair.*

NOTE

Procedures assume auxiliary control box panels removed and leads to individual components already tagged and removed.

(1) *Sheet counter.* (figure 2-275)

(a) Release retaining spring (1) and remove sheet counter (2).

(b) Replace defective sheet counter.

(c) Replace sheet counter (2) in panel (3) and secure with spring (1).

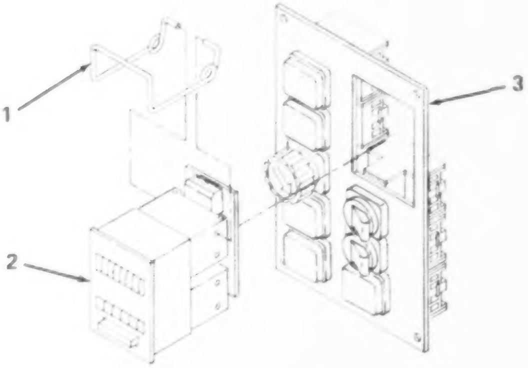

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Figure 2-275. Sheet Counter Repair.

(2) *Switches.* (figure 2-276) (Typical, all panels)

(a) Remove retainer clip (1), switch body (2), and push button (3).

(b) Remove plastic nut (4) and push button holder (5).

(c) Replace defective or damaged switch.

(d) Replace push button holder (5) through panel hole (6) and replace plastic nut (4).

(e) Replace switch body (2) into retaining ring (4) and replace push button (3).

(f) Replace retainer clip (1).

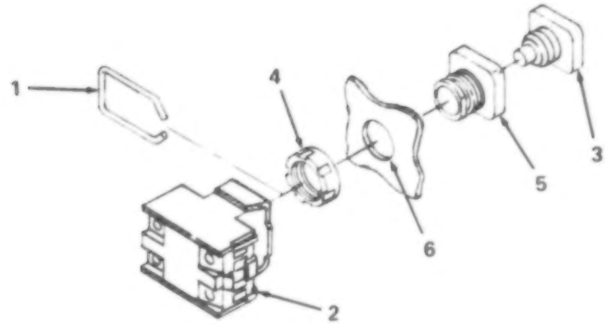

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Figure 2-276. Switch Repair.

(3) *Indicator light repair.* (figure 2-277) (Typical, all panels)

(a) Remove retainer clip (1), light socket (2), and indicator lens (3).

(b) Remove plastic nut (4) and lens holder (5).

(c) Remove light (6) from light socket (2).

(d) Replace burnt out light. Replace defective light socket or broken lens.

(e) Replace light (6) in light socket (2).

(f) Replace lens holder through hole (7) in panel.

(g) Replace light socket (2) into plastic nut (4) and replace indicator lens (3).

(h) Replace retainer clip (1).

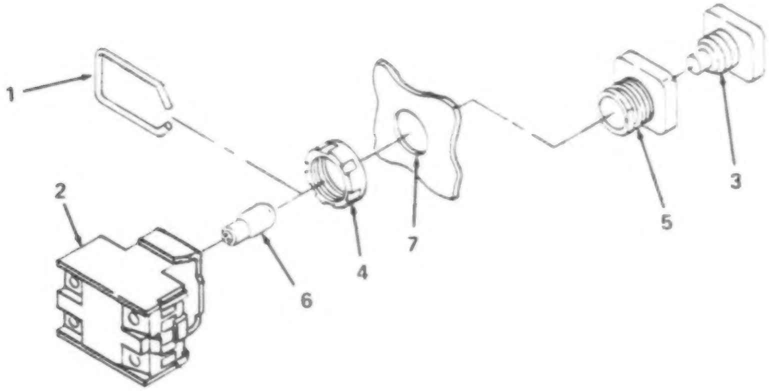

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Figure 2-277. Indicator Light Repair.

2-95. Control Register System.

This task covers: a. Service b. Replace c. Inspect d. Repair

INITIAL SETUP

Tools

0.050 x 0.375 x 8 in. flat-tip screwdriver
5 mm hex key
Ball-peen hammer
2 mm pin punch

a. Service. Lubricate as required. Refer to Operation of Auxiliary Equipment in TM 5-3610-286-10.

b. Replace. If defects in the control register cannot be corrected by the repair procedures in this paragraph, replace the unit.

c. Inspect.

(1) Inspect for loose or damaged punching units.

(2) Inspect for binding in lever rotation.

d. Repair. (figure 2-278)

(1) Remove four screws (1) and cover (2).

(2) Remove 16 socket-head screws (3), 16 star washers (4), and eight set squares (5).

(3) Remove eight socket-head screws (6), eight spring tension pins (7), and four punching units (8).

(4) Remove three screws (9), three lockwashers (10), and punch holding beam (11).

(5) Replace any damaged or worn punching units.

(6) Position punch holding beam (11) and replace three screws (9) and three lockwashers (10).

(7) Aline four punching units (8) with mounting holes in punch holding beam (11), and replace eight spring tension pins (7) and eight socket-head screws (6).

(8) Position eight set squares (5) and replace 16 socket-head screws (3) and 16 star washers (4).

(9) Replace cover (2) and four screws (1).

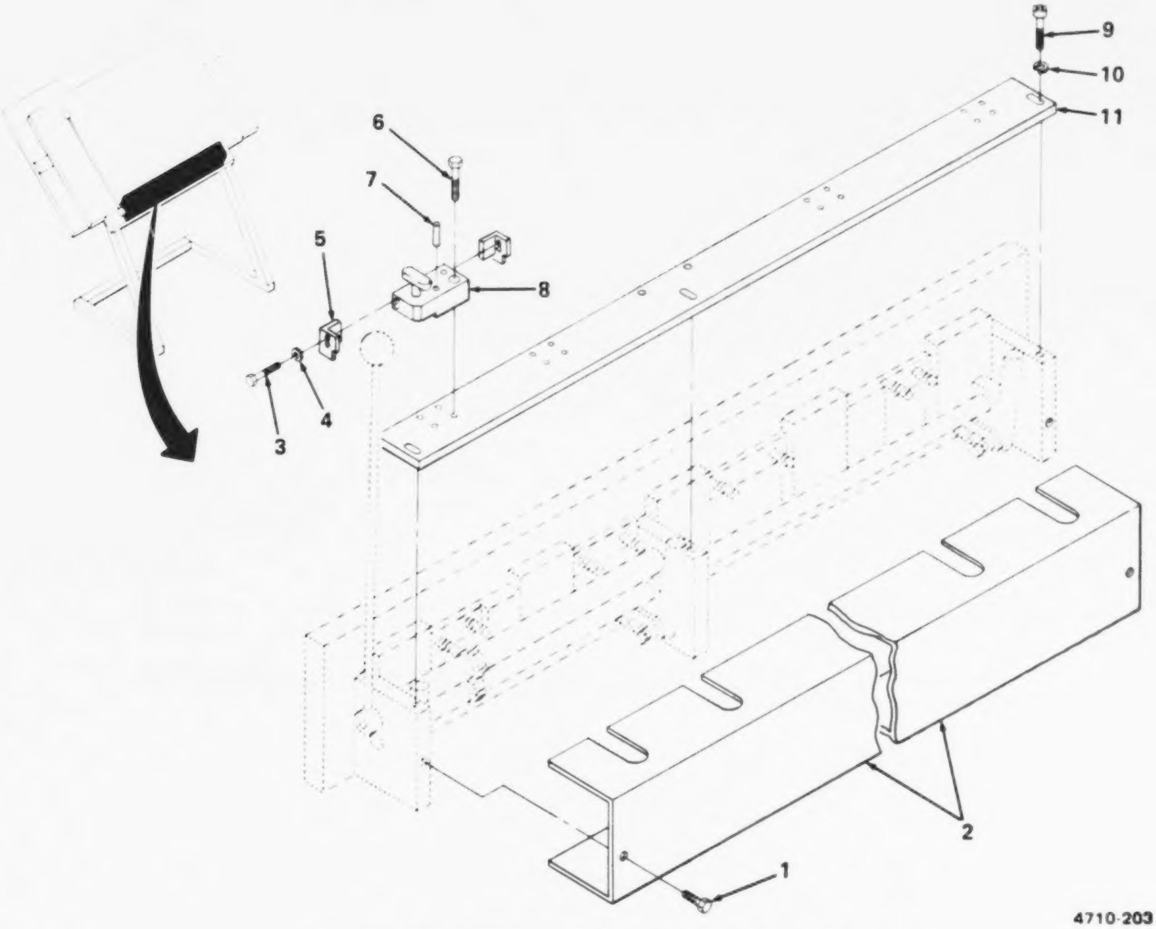

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Figure 2-278. Control Register System Repair.

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2-96. Adjustment of Timing Settings.

This task covers: Adjustment

INITIAL SETUP

Tools

Gage, slide
Disc, graduated
Mounting bolt

Equipment Conditions

As required by maintenance procedure being performed

a. *Adjustment.*

NOTE

Timing of mechanical movements and actions during operation of the printing press is critical. Operations that occur before or after they are designed to occur will degrade performance of the press. Timing settings should be checked and adjusted after repair or replacement of assemblies as noted in this paragraph.

(1) *Test setup.* All measurments are related to same position contained in the 360 degrees that equal one rotation of a press cylinder. The point of reference is the so called "zero position" ("0" position) of the press; the point begin line located vertically above the center of the impression cylinder. This position is marked by an engraved line and the letter "D" between the measuring ring and the printing surface of the impression cylinder, D/S. Set up the printing press for measurements as follows:

(a) Put press in impression ON.

(b) Open plate cylinder access door (D/S) (figure 2-279) and insert mounting bolt into plate cylinder journal.

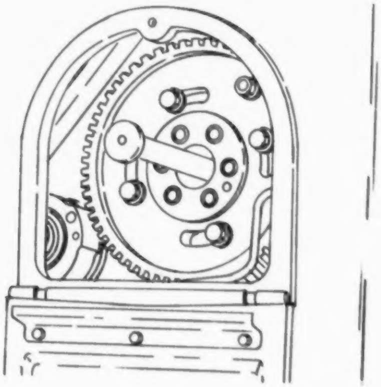

Figure 2-279. Installation of Mounting Bolt.

(c) Insert slide gage into hole on inner slide of D/S frame above the impression cylinder (figure 2-280). Turn press forward by hand until the marking "D" on the impression cylinder meets the front edge of the slide gage (see arrow in figure 2-280).

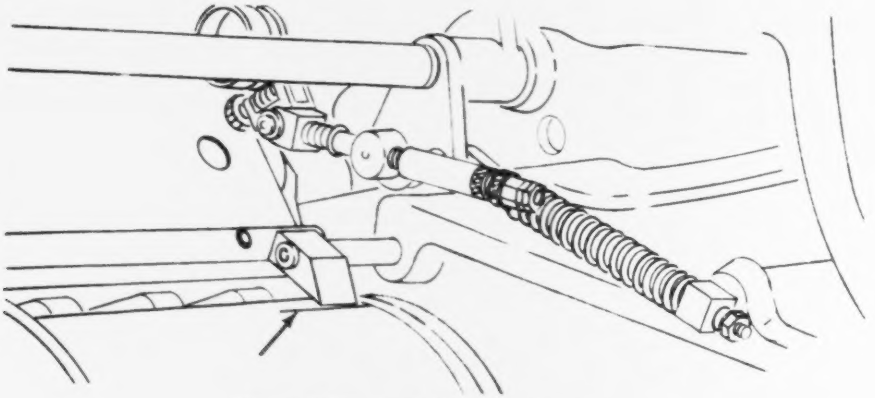

Figure 2-280. Installation of Slide Gage.

(d) Install graduated disc on mounting shaft (figure 2-281).

NOTE

In forward mode, press plate cylinder turns clockwise.

(e) Position the "O" point of the degree dial at the mark provided by the oil catcher strap and clamp the dial.

NOTE

If there is no mark on the strap, make one exactly under the middle of the cylinder.

(f) "O" position of the press is now coordinated with "O" position of graduated dial.

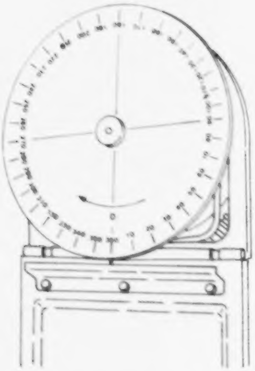

Figure 2-281. Installation of Graduated Disc.

2-96. Adjustment of Timing Settings (cont).

(2) *Degree settings for printing unit.* Turn the press by hand and observe that the machine operations listed in table 2-6 occur at the degree setting indicated on the graduated disc opposite the mark on the oil catcher strap. If the machine operations occur at the correct position (degree setting), the timing of press operations is correct. If not, adjust as described in the appropriate maintenance paragraph.

Table 2-6. Degree Settings for Printing Unit.

Setting (Degrees)	Operation
0°	Zero position: impression cylinder mark "D" meets edge of slide gauge
49° (approx.)	Delivery sheet joggers start moving inwards
70°30'	Rubber blanket cylinder is in print begin position relative to impression cylinder ("G" mark on impression cylinder)
176°	Delivery grippers closing ("A" mark on impression cylinder)
177°	Impression cylinder grippers opening
256°	Impression cylinder grippers closing ("V" mark on impression cylinder)
257°	Ranger drum grippers opening
290°	Inking vibrator rollers touching ink distributor cylinder

NOTE

Check that grippers are closed by insertion onion skin sheet of paper as grippers are closing. When correctly closed, sheet may be pulled out with slight drag.

(3) *Degree settings for feeder unit.* Due to gear backlash, the "O" position of the press is not used for paper feed operations timing measurements.

(a) Before taking readings for adjustments performed on the side lays, front lays, and feeder, reset the graduated disc as follows:

1 Set ranger drum gripper bar to "paper".

2 Turn press by hand until the transfer position from the feed table to the ranger drum has been reached.

3 Check carefully with a small 90 degree square (figure 2-282). The gripper bar of the ranger drum must form a 90 degree angle with the feed table.

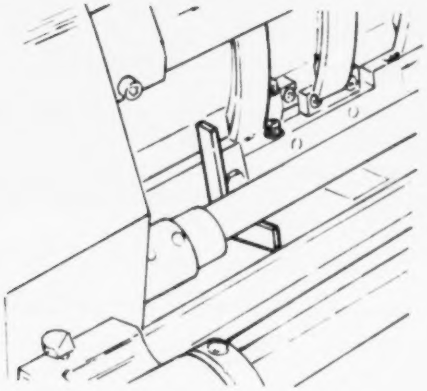

Figure 2-282. Ranger Drum Gripper Bar Position.

4 With press in this position, unclamp graduated disc and set it to 85°30' and reclamp.

5 Recheck "O" position of disc by turning press by hand until "D" position or impression cylinder alines with leading edge of slide gage.

6 Set the scale at the feeder chain sprocket to "0" position (figure 2-283).

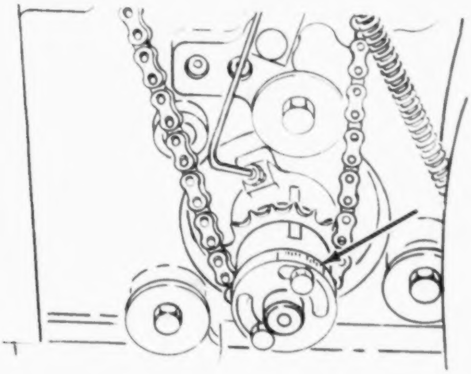

Figure 2-283. Feeder Chain Sprocket "Zero" Adjustment.

2-96. Adjustment of Timing Settings (cont).

(b) Turn press by hand and observe that feeder unit operations listed in table 2-7 occur at the degree setting indicated on the graduated disc opposite the mark on the oil catcher strap. If the feeder operation occurs at the correct position (degree setting), the timing of paper feed operations is correct. If not, adjust as described in the appropriate maintenance paragraph.

Table 2-7. Degree Settings for Feeder Unit Operations.

Setting (Degrees)	Operation
10°	End of advancing time of feeder
25°30'	Side lay at lowest point
83°30' to 84°	Side lay moving up. (Note 1)
85° to 85°30'	Ranger drum grippers closing. (Note 2)
85°30'	Start of backing off front lays (Ranger drum gripper bar at 90 degree angle with feed table (Note 3))
310°	Beginning of advancing time of feeder. Impression control magnet is released
328°	Sheet arrives at front lays

NOTES

(1) Check clearance between side lays and feed table to be 0.1 mm.
(2) Check gripper closing with onion skin paper.
(3) First set front lays to "wide gripper margin".

(3) *Backlash.*

(a) Check for backlash using dial gage.

(b) Normal allowable backlash between mating cylinder gears is illustrated in figure 2-284.

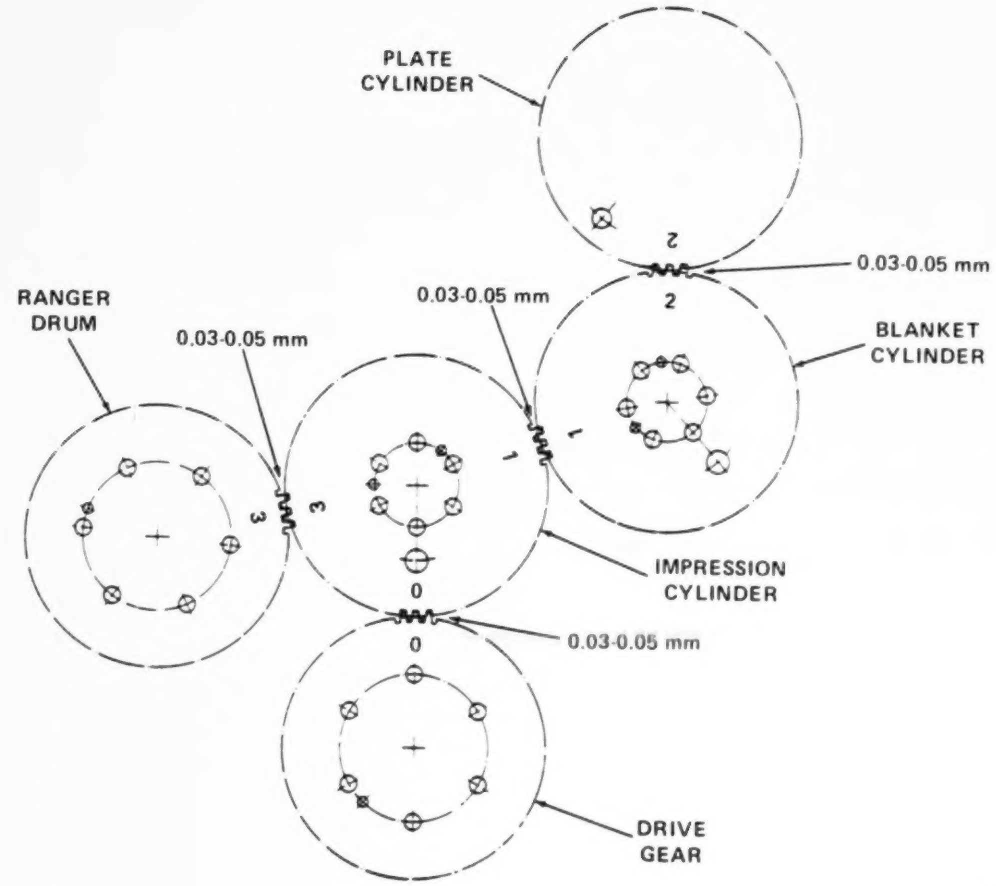
PLATE CYLINDER
2
0.03-0.05 mm
2
BLANKET CYLINDER
RANGER DRUM
0.03-0.05 mm
0.03-0.05 mm
1
1
3
3
IMPRESSION CYLINDER
0
0.03-0.05 mm
0
DRIVE GEAR
4710-297

Figure 2-284. Nominal Gear Backlash.

NOTE

FOLLOW-ON MAINTENANCE:
Remove slide gage, graduate disc and mounting bolt.

APPENDIX A

REFERENCES

A-1. Scope. This appendix lists all forms, field manuals, technical manuals, and miscellaneous publications referenced in this manual.

A-2. Forms.

Hand Receipt/Annex Number	DA Form 2062
Equipment Inspection and Maintenance Worksheet	DA Form 2404
Packaging Improvement Report	DD Form 6

A-3. Field Manuals.

First Aid for Soldiers	FM 21-11

A-4. Technical Manuals.

Offset Photolithography and Map Reproduction	TM 5-245
Operator's Manual for Topographic Support System Press Section Printing Press	TM 5-3610-286-10
Operator's Manual for Topographic Support System Press Section	TM 5-3610-287-10
Organizational, Direct Support, and General Support Maintenance Manual for Topographic Support System Press Section	TM 5-3610-287-24
Organizational Maintenance Repair Parts and Special Tools List for Topographic Support System Press Section Printing Press	TM 5-3610-286-20P
Organizational Direct Support, and General Support Maintenance Repair Parts and Special Tools List for Topographic Support System Press Section	TM 5-3610-287-24P
Operator's, Organizational, Direct Support, and General Support Maintenance Manual for the Topographic Support System Chassis, Semi-trailer	TM 5-2330-305-14
Hand Receipt Covering Contents of Components of End Item (COEI), Basic Issue Items (BII), and Additional Authorization List (AAL) for Topographic Support System Press Section Printing Press	TM 5-3610-286-12-HR

A-5. Miscellaneous Publications.

Lubrication Order for Topographic Support System Press Section Printing Press	LO 5-3610-286-12
Lubrication Order for Topographic Support System Press Section	LO 5-3610-287-12
The Army Maintenance Management System (TAMMS)	DA PAM 738-750
Photolithographers Soldier's Manual and Trainer's Guide	STP 5-83F24-SM-TG
Identification and Distribution of DA Publications and Issue of Agency and Command Administrative Publications	AR 310-2

APPENDIX B

MAINTENANCE ALLOCATION CHART

Section I. INTRODUCTION

B-1. GENERAL

a. This section provides a general explanation of all maintenance and repair functions authorized at various maintenance categories.

b. The Maintenance Allocation Chart (MAC) in section II designates overall authority and responsibility for the performance of maintenance functions on the identified end item or component. The application of the maintenance functions to the end item or component will be consistent with the capacities and capabilities of the designated maintenance categories.

c. Section III lists the tools and test equipment (both special tools and common tool sets) required for each maintenance function as referenced from section II.

d. Section IV contains supplemental instructions and explanatory notes for a particular maintenance function.

B-2. MAINTENANCE FUNCTIONS. Maintenance functions will be limited to and defined as follows:

a. Inspect. To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination (e.g., by sight, sound, or feel).

b. Test. To verify serviceability by measuring the mechanical, pneumatic, hydraulic, or electrical characteristics of an item and comparing those characteristics with prescribed standards.

c. Service. Operations required periodically to keep an item in proper operating condition, i.e., to clean (includes decontaminate, when required), to preserve, to drain, to paint, or to replenish fuel, lubricants, chemical fluids, or gases.

d. Adjust. To maintain or regulate, within prescribed limits, by bringing into proper or exact position, or by setting the operating characteristics to specified parameters.

e. Align. To adjust specified variable elements of an item to bring about optimum or desired performance.

B-2. MAINTENANCE FUNCTIONS (CONT)

f. Calibrate. To determine and cause corrections to be made or to be adjusted on instruments or test, measuring, and diagnostic equipments used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

g. Remove/Install. To remove and install the same item when required to perform service or other maintenance functions. Install may be the act of emplacing, seating, or fixing into position a spare, repair part, or module (component or assembly) in a manner to allow the proper functioning of an equipment or system.

h. Replace. To remove an unserviceable item and install a serviceable counterpart in its place. "Replace" is authorized by the MAC and is shown as the third position code of the SMR code.

i. Repair. The application of maintenance services,[1] including fault location/troubleshooting,[2] removal/installation, and disassembly/assembly procedures,[3] and maintenance actions[4] to identify troubles and restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system.

j. Overhaul. That maintenance effort (service/action) prescribed to restore an item to a completely serviceable/operational condition as required by maintenance standards in appropriate technical publications (i.e, DMWR). Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like-new condition.

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[1] Services - inspect, test, service, adjust, align, calibrate, and/or replace.

[2] Fault locate/troubleshoot - the process of investigating and detecting the cause of equipment malfunctioning; the act of isolating a fault within a system or unit under test (UUT).

[3] Disassemble/assemble - encompasses the step-by-step taking apart (or breakdown) of a spare/functional group coded item to the level of its least componency identified as maintenance significant (i.e., assigned an

[4] Actions - welding, grinding, riveting, straightening, facing, remachining, and/or resurfacing.

B-2. MAINTENANCE FUNCTIONS (CONT)

k. Rebuild. Consists of those services/actions necessary for the restoration of unserviceable equipment to a like-new condition in accordance with original manufacturing standards. Rebuild is the highest degree of materiel maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (hours/miles, etc.) considered in classifying Army equipment/components.

B-3. EXPLANATION OF COLUMNS IN THE MAC, SECTION II

a. Column 1, Group Number. Column 1 lists functional group code numbers, the purpose of which is to identify maintenance significant components, assemblies, subassemblies, and modules with the next higher assembly. End item group number shall be "00."

b. Column 2, Component/Assembly. Column 2 contains the names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

c. Column 3, Maintenance Function. Column 3 lists the functions to be performed on the item listed in column 2. (For a detailed explanation of these functions, see paragraph B-2.)

d. Column 4, Maintenance Category. Column 4 specifies, by the listing of a work time figure in the appropriate subcolumn(s), the category of maintenance authorized to perform the function listed in column 3. This figure represents the active time required to perform that maintenance function at the indicated category of maintenance. If the number or complexity of the tasks within the listed maintenance function vary at different maintenance categories, appropriate work time figures will be shown for each category. The work time figure represents the average time required to restore an item (assembly, subassembly, component, module, end item, or system) to a serviceable condition under typical field operating conditions. This time includes preparation time (including any necessary disassembly/assembly time), troubleshooting/fault location time, and quality assurance/quality control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the maintenance allocation chart. The symbol designations for the various maintenance categories are as follows:

C	Operator or crew
O	Organizational maintenance
F	Intermediate Direct Support maintenance
H	Intermediate General Support maintenance
D	Depot maintenance

e. Column 5, Tools and Equipment. Column 5 specifies, by code, those common tool sets (not individual tools) and special tools, TMDE, and support equipment required to perform the designated function.

B-3. EXPLANATION OF COLUMNS IN THE MAC, SECTION II (CONT)

f. Column 6, Remarks. This column shall, when applicable, contain a letter code, in alphabetic order, which shall be keyed to the remarks contained in section IV.

B-4. EXPLANATION OF COLUMNS IN TOOL AND TEST EQUIPMENT REQUIREMENTS, SECTION III

a. Column 1, Reference Code. The tool and test equipment reference code correlates with a code used in the MAC, section II, column 5.

b. Column 2, Maintenance Category. The lowest category of maintenance authorized to use the tool or test equipment.

c. Column 3, Nomenclature. Name or identification of the tool or test equipment.

d. Column 4, National Stock Number. The National stock number of the tool or test equipment.

e. Column 5, Tool Number. The manufacturer's part number.

B-5. EXPLANATION OF COLUMNS IN REMARKS, SECTION IV

a. Column 1, Reference Code. The code recorded in section II, column 6.

b. Column 2, Remarks. This column lists information pertinent to the maintenance function being performed as indicated in the MAC, section II.

Section II. MAINTENANCE ALLOCATION CHART

NOMENCLATURE OF END ITEMS:

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			C	O	F	H	D		
00	PRINTING PRESS	INSPECT	0.3						
		ADJUST	0.5						
01	SOLUTION CONTAINER GROUP								
	TUBE ASSEMBLY	REPLACE		0.2				7,13	
		REPAIR		0.2				1,64	
	SOLUTION CONTAINER ASSEMBLY	INSPECT	0.1						
		SERVICE	0.3						
		REPAIR		0.1				1,53	A
02	MAIN GUARD GROUP								
	CONTAINER SHELF ASSY	REPLACE		0.4				12,51,53, 81	
		REPAIR		1.0				12,51,53, 81	
	INKING FOUNTAIN GUARD	REPLACE		0.3				1,25	
		REPAIR		0.2				1,25	
	SAFETY LIMIT SWITCH	TEST		0.4				10,13,46	
		ALINE		0.2				10,13,43	
		REPLACE		0.6				10,13	
	BELT GUARD	REPLACE		0.4				1,50,53 60,61,81	
		REPAIR		0.5				1,50,53 60,61,81	
	UPPER GUARD & ACCESSORIES(OS)	REPLACE		0.8				1,24,25 30,32,33, 57,62,71	
		REPAIR		0.3				1,24,25, 30,32,33, 57,62,71	

Section II. MAINTENANCE ALLOCATION CHART

NOMENCLATURE OF END ITEMS:

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			C	O	F	H	D		
02	LOWER GUARD & ACCESSORIES(OS)	REPLACE		0.5				1,26,79, 81,83	
		REPAIR		0.3				1,26,79, 81,83	
	MAIN GUARD ASSEMBLY	REPLACE		0.8				1,25,26 50,54,57, 62,81,83	
	DELIVERY GUARD	REPLACE		0.7				24,25,30, 33,49,80, 83	
		REPAIR		0.5				24,25,30, 33,49,80, 83	
03	INKING GROUP								
	MANUAL INKING ROLLER	SERVICE	0.1					15,16	
		REPLACE		0.5				10,24,30 33,37,50, 57,62	
		REPAIR		0.7				10,24,30, 33,37,50, 57,62	
	*INKING ROLLERS	INSPECT	0.1						
		SERVICE	0.3					15	
		REMOVE/ INSTALL	0.5					2,3	
		REPLACE	0.5					2,3	
		REPAIR	1.0					2,3,5	B
	FORM ROLLERS LIMIT SWITCH	TEST		0.2				10,13,46	
		ALINE		0.4				10,13,43	
		REPLACE		0.5				10,13	
	**INKING FOUNTAIN ASSEMBLY	INSPECT	0.4						
		SERVICE	0.8						
		REPLACE		1.0				26,30,37, 53,61,64, 83	
		REPAIR		1.1				26,30,37, 53,61,64, 83	

*INCLUDES LOWER OSCILLATION ROLLER

**INCLUDES FOUNTAIN ROLLER

Section II. MAINTENANCE ALLOCATION CHART

NOMENCLATURE OF END ITEMS:

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			C	O	F	H	D		
03	WASHUP CONTAINER ASSEMBLY	REPAIR	0.3					23	
	ROLLER GUIDE RAIL ASSEMBLIES	INSPECT		0.4					
		SERVICE		0.5				15,22	
		REPLACE		0.4				9,24,26 80,81,83	
		REPAIR		1.2				9,24,26 80,81,83	
	OSCILLATOR LEVEL ASSEMBLIES	REPLACE		3.1				29,30,33 34,60,62, 63,67,71, 77,80,81 84	
		REPAIR		5.1				29,30,33, 34,60,62, 63,67,71, 77,80,81, 84	
	SWIVEL LEVER ASSEMBLIES	INSPECT	0.5						
		ADJUST		0.2				10	
		REPLACE		3.0				9,11,24, 25,30,32, 36,80,81	
		REPAIR		2.0				9,11,24, 25,30,32, 36,80,81	
	JOURNAL BOX HOUSING ASSEMBLIES	REPLACE		2.6				9,24,25, 30,32,36, 51,53,61, 80,81	
		REPAIR		1.3				9,24,25, 30,32,36, 51,53,61, 80,81	
	DRIVING MECHANISM	REPLACE		1.5				14,24,25, 29,30,37, 53,61,71, 80,81	
		REPAIR		1.2				14,24,25, 29,30,37, 53,61,71, 80,81	

Section II. MAINTENANCE ALLOCATION CHART

NOMENCLATURE OF END ITEMS:

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			C	O	F	H	D		
03	VIBRATOR ROLLER BEARING	SERVICE	0.1					15,16	
		REPLACE		0.9				30,34,71	
		REPAIR		0.7				30,34,71	
	ROLLER ADJUSTERS & FEELER RODS	ADJUST	0.2						
		ALINE		0.5				24,30,32, 50,60,80	
		REPLACE		0.3				24,30,32, 50,60,80	
		REPAIR		0.8				24,30,32, 50,60,80	
	DUCTOR ROLLER SWING MECHANISM	SERVICE	0.1					16,22	
		REPLACE		1.6				30,32,50, 71,80,81	
		REPAIR		2.5				30,32,50, 71,80,81	
	UPPER OSCILLATOR ROLLER & BEARING ASSEMBLY	REPLACE		2.5				2,24,25, 30,33,59, 71,75	
		REPAIR		1.5				2,24,25, 30,33,59, 71	
	DISTRIBUTOR ROLLER LATCH ASSEMBLY	REPLACE		0.6				10,30,32, 36,50,71	
		REPAIR		0.6				10,30,32, 36,50,71	
04	DAMPENING GROUP								
	DAMPENING ROLLERS	INSPECT	0.1						
		SERVICE	0.4					15	
		ALINE	0.2					10	
		REMOVE/ INSTALL	0.2						
		REPLACE	0.2					5,14	
		REPAIR	1.0					5,14	
	VIBRATOR ROLLER & BEARING ASSEMBLIES	SERVICE	0.1					15,16	
		REPLACE		0.6				30,33,53, 61,71	
		REPAIR		0.8				30,33,53, 61,71	

Section II. MAINTENANCE ALLOCATION CHART

NOMENCLATURE OF END ITEMS:

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			C	O	F	H	D		
	ENGAGING LEVEL ASSEMBLY	ADJUST		0.5				53	
		REPLACE		0.6				30,33,71	
		REPAIR		0.7				30,33,71	
	DAMPENING FOUNTAIN ASSEMBLY	INSPECT	0.1						
		SERVICE	0.2					15	
		REPLACE		0.1				66	
		REPAIR		0.3				49,66	
	DAMPENING OSCILLATOR BEARING ASSEMBLIES	REPLACE		1.5				4,10,25,30,33,67,81	
		REPAIR		1.5				4,10,25,30,33,67,81	
	DISENGAGING SHAFT ASSEMBLY	INSPECT		0.2					
		SERVICE		0.1					
		REPLACE		3.3				30,33,50,71	
		REPAIR		2.9				30,33,50,71	
	SWIVELING LEVER ASSEMBLIES	INSPECT		0.5					
		SERVICE	0.2					15,16	
		REPLACE		5.0				10,24,30,37,49,71,80	
		REPAIR		4.6				10,24,30,37,49,71,80	
	BEARING BOLT ASSEMBLIES	REPLACE		0.2				30,50,60,71	
		REPAIR		0.4				30,50,60,71	
	DISENGAGING ASSEMBLY	REPLACE		0.4				25,30,33,35,57,62,81	
		REPAIR		0.4				25,30,33,35,57,62,81	

Section II. MAINTENANCE ALLOCATION CHART

NOMENCLATURE OF END ITEMS:

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL C	O	F	H	D	(5) TOOLS AND EQUIPMENT	(6) REMARKS
05	PLATE CYLINDER GROUP								
	SWING GEARS	INSPECT	0.1						
		SERVICE	0.6					17,18,50,57,59,79,80	
		ADJUST	0.5					17,18,50,57,59,79,80	
		REPLACE		2.0				25,27,30,33,50,59,60,63,81,84	
		REPAIR		2.5				25,27,30,33,50,59,60,63,81,84	
	PLATE CYLINDER	INSPECT	0.1						
		SERVICE	0.5	0.5				15,16	C
		ADJUST	0.6						
		REPLACE		0.3			36.0	14	S
		REPAIR		0.5			6.0	14	S
	COVER PLATE ASSEMBLY	REPLACE		0.9				25,81	D
		REPAIR		0.9				25,81	D
	PLATE CLAMP	REPLACE		0.2				25,57,62,81	
		REPAIR		0.4				25,57,62,81	
	REGISTER SCOPE	ADJUST		0.1				79	
		REPLACE		0.1				79	
06	REGISTER GROUP								
	SUCTION VALVE HOUSING ASSEMBLY & MOTOR	TEST		0.6				10,46	
		REPLACE		1.6				10,47,53,81	
		REPAIR		1.3				10,47,53,81	

Section II. MAINTENANCE ALLOCATION CHART

NOMENCLATURE OF END ITEMS:

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			C	O	F	H	D		
06	PULL SIDE LAY ASSY	INSPECT		0.1					
		SERVICE		0.1				15,22	
		ADJUST		0.5				24,34,44, 79,80	
		REPLACE		1.0			2.3	9,10,24 25,30,34, 39,40,41, 42,44,49, 50,53,60, 61,71,79, 80,81	S
		REPAIR		1.0				9,10,24, 25,30,34, 39,40,41, 42,44,49, 50,53,60, 61,71,79, 80,81	
	PULL RAIL ASSEMBLY	ADJUST		1.2				9,24,25, 48,80,81	E
		REPLACE		1.5				9,24,25, 48,80,81	
		REPAIR		2.0				9,24,25, 48,80,81	
	SHAFT ASSEMBLY	TEST		0.4				10,46	
		SERVICE		0.1				15,16	
		ADJUST		0.2				10	
		REPLACE		1.5				8,11,25	
		REPAIR		1.6				8,11,25	
	SIDE FRAME ASSEMBLY	SERVICE	0.1					16	
		REPLACE					2.0		S
		REPAIR					2.0		S
	FRONT LAY ASSEMBLY	SERVICE	0.2					15,16	
		ADJUST	0.5	0.3				24,43,49, 53,59,80	
		REPLACE		2.0				24,43,49, 53,59,80	
		REPAIR		1.2				24,43,49, 53,59,80	

Section II. MAINTENANCE ALLOCATION CHART

NOMENCLATURE OF END ITEMS:

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL C	O	F	H	D	(5) TOOLS AND EQUIPMENT	(6) REMARKS
07	DELIVERY GROUP								
	DUST CATCHER ASSEMBLY	INSPECT	0.1						
		SERVICE	0.2					15,16	
		REPLACE		0.5				10,50,60,67	
		REPAIR		1.0				10,50,60,67	
	DELIVERY LIGHT ASSEMBLY	REPLACE		0.5				50	
		REPAIR	0.2					10,80	F
	SHEET STOP ASSEMBLY	REPLACE		0.5				30,34,39,40,41,42,50,60	
		REPAIR		0.5				30,34,39,40,41,42,50,60	
	BLOWER TUBE ASSEMBLIES	REPLACE		0.5				1,30,32,57,62,68	
		REPAIR		0.2				1,30,32,57,62,68	
	GRIPPER SYSTEM ASSEMBLY	INSPECT	0.1						
		SERVICE	0.2					15,16	
		ADJUST		1.0				24,25,43	
		REPLACE		0.5				1,24,25,50,59,71	
		REPAIR		1.0			2.8	1,24,25,50,59,71	G,S
	SUCTION SLOWDOWN ASSEMBLY	INSPECT	0.3						
		SERVICE	0.2					15,16	
		REMOVE/ INSTALL		0.3				10,25,30,33,49,53,61,81	
		REPAIR		1.3				10,25,30,33,49,53,61,81	
	SUCTION DRUM MOTOR	REPLACE		0.5				11,49	

Section II. MAINTENANCE ALLOCATION CHART

NOMENCLATURE OF END ITEMS:

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			C	O	F	H	D		
07	SUCTION DRUM LIMIT SWITCH	TEST		0.4				10,13,46	
		REPLACE		0.5				10,13	
	CHAIN SPROCKET ASSEMBLY	INSPECT	0.1						
		SERVICE	0.2					15,16	
		REPLACE		2.0				9,24,30,34,53,59,61,63,71,80	
		REPAIR		2.5				9,24,30 34,53,59,61,63,71,80	
	CAM LEVER ASSEMBLY	SERVICE		0.1				16,22	
		REPLACE		0.8				9,30,34,50	
		REPAIR		0.9				9,30,34,50	
	TRIP BLOCK ASSEMBLY	SERVICE		0.1				16,22	
		REPLACE		0.5				10,48,49,50	
		REPAIR		0.4				10,48,49,50	
	PILE LIFTING MOTOR ASSY	TEST		0.3			1.1	10,46	S
		SERVICE	0.1					77,78	
		ADJUST		0.3				57,62	
		REPLACE		0.5				10,27,57,62	
		REPAIR		0.5			1.5	10,27,57,62	S
08	RANGER DRUM GROUP								
	CYLINDER SAFETY GUARD ASSY	TEST		0.2				10,12,46	
		ALINE		0.2				10,12	
		REPLACE		0.3				10,12,24,27	

Section II. MAINTENANCE ALLOCATION CHART

NOMENCLATURE OF END ITEMS:

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL C	O	F	H	D	(5) TOOLS AND EQUIPMENT	(6) REMARKS
	CAM SHAFT ASSEMBLY	REPLACE		1.7				25,30,35, 53,57,61, 63,81	
		REPAIR		1.5				25,30,35, 53,57,61, 63,81	
	RANGER DRUM SHAFT ASSY	ADJUST		0.4				12,18	
		REPLACE		3.0				12,25,30, 35,48,57, 62,64,71, 81	
		REPAIR		1.0			2.0	12,25,30, 35,48,57, 62,64,71, 81	S
	ELECTRO-MAGNETIC SWITCH	TEST		0.3				10,13,46	
		ALINE		0.2				10,13,43	
		REPLACE		1.1				11,49,53, 71,74,80, 81	
09	IMPRESSION CYLINDER GROUP								
	IMPRESSION CYLINDER CONTROL MECHANISM	TEST		0.3				11,46	
		ADJUST		0.3				43,50,53, 57,59,80	
		REPLACE		2.0				30,34,36, 50,53,57, 59,71,80	
		REPAIR		2.8				30,34,36, 50,53,57, 59,71,80	
	IMPRESSION CYLINDER ASSEMBLY	INSPECT		0.5					
		SERVICE		0.2				15,16	
		ADJUST		1.5				62	
		REPLACE		2.0			36.0	19,39,40, 47,62	
		REPAIR		1.5			12.0	19,39,40, 47,62	I,S

Section II. MAINTENANCE ALLOCATION CHART

NOMENCLATURE OF END ITEMS:

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			C	O	F	H	D		
09	ENGAGING LEVER LATCH ASSEMBLY	REPLACE	1.7					30,33,71	
		REPAIR		2.3				30,33,71	
10	BLANKET CYLINDER GROUP								
	SPINDLE & BEARING BOLT ASSY	INSPECT	0.5						
		SERVICE	0.5						
		TEST	1.0						
		REPLACE		6.0			40.0	2,8,10, 30,33,50, 57,60,62	S
		REPAIR		8.0			38.0	2,8,10, 30,33,50, 57,60,62	S
	DEFLECTOR ASSEMBLY	TEST	0.1						J
		REPLACE		1.1				30,33,49, 71	
		REPAIR		1.4				30,33,49, 71	
	SAFETY LIMIT SWITCH	TEST		0.4				10,13,46	
		ALINE		0.5				10,13,43	
		REPLACE		0.5				10,13	
	BLANKET	INSPECT	0.1						
		SERVICE	0.5						
		REMOVE/ INSTALL	0.5					7	
		REPAIR	1.5					7	
	BLANKET CYLINDER ASSEMBLY	INSPECT	0.2						
		SERVICE	0.5					15,16	
		TEST	0.1						
		ADJUST		0.6				1,8,26, 43,48,49, 51,72	
		REPLACE					40.0		S
		REPAIR		8.0			38.0	1,8,26, 48,49	S
	COVER PLATE ASSEMBLY	REPLACE		1.0				25,81	D
		REPAIR		1.0				25,81	D

Section II. MAINTENANCE ALLOCATION CHART

NOMENCLATURE OF END ITEMS:

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			C	O	F	H	D		
11	MAIN LUBRICATION SYSTEM								
	GEAR BOX ASSEMBLY	INSPECT	0.1	1.0					
		SERVICE	1.0					19,21,26	
		REPLACE		1.6				9,10,24 25,26,27, 50,53,57, 59,60,61, 62,63,71, 80,81,83, 84,87,88	
		REPAIR		3.0				9,10,24, 24,26,27, 50,53,57, 59,60,61, 62,63,71, 80,81,83, 84,87,88	
	LUBRICATION DISTRIBUTION SYSTEM	INSPECT		1.8					
		REPLACE		2.0				9,24,49, 52,54,59, 63,64,80	
		REPAIR		2.5				9,24,49, 52,54,59, 63,64,80	
12	MAIN MOTOR AND DRIVE ASSEMBLY								
	MAIN MOTOR AND DRIVE	INSPECT		0.5				8	
		SERVICE		0.6				8	
		TEST		0.6				8,46	
		REPLACE					10.0		S
		REPAIR		2.0			16.0	9,10,24 49,65,80	S
	V-BELT	ADJUST		0.7				59,63,65, 72	
		REPLACE		2.0				59,63,65	

Section II. MAINTENANCE ALLOCATION CHART

NOMENCLATURE OF END ITEMS:

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			C	O	F	H	D		
13	TRANSFER DRUM	INSPECT		0.3					
		REPLACE		1.6				10,30,31, 50,81,83	K
		REPAIR		0.7				10,30,31, 50,81,83	
14	FEEDER GROUP								
	SHEET SMOOTHER & ACCESSORIES	INSPECT	0.2						
		ADJUST	0.2					30,31	
		REMOVE/ INSTALL	0.2					30,31	
		REPLACE		0.3				30,31	
		REPAIR		0.8				10,30,31, 32,50,53, 71,80,81	
	STATIC BAR ASSEMBLY	SERVICE	0.1						
		TEST		0.3				11,46	
		REPLACE		0.5				11,12,23, 50,53,57, 58,60	
		REPAIR		1.0				11,12,23, 50,53,57, 58,60	
	UNIVERSAL JOINT SHAFT	INSPECT		0.2					
		ALINE		0.5				43,50,60	
		REPLACE		0.8				10,30,35, 50,60	
		REPAIR		1.3				10,30,35, 50,60	
	SUCTION HEAD ASSY	INSPECT	0.2						
		SERVICE	0.5					15,16	
		ALINE		0.5				43,50	
		REPLACE		0.6				10,24,43, 50	
		REPAIR	0.3				6.0	10,24,43, 50	L,M,S

Section II. MAINTENANCE ALLOCATION CHART

NOMENCLATURE OF END ITEMS:

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			C	O	F	H	D		
	SHEET FORWARDING ASSEMBLY	INSPECT	0.2						
		SERVICE	0.5					15,16	
		ADJUST	0.6						
		REPLACE		2.2				9,24,30, 50,71,80	
		REPAIR		3.2				6,29,30, 32,33,34, 37,45,50, 53,70,71, 76,80,81	N
	DOUBLE SHEET DETECTOR MECHANISM	INSPECT	0.1						
		SERVICE	0.1					15	
		ADJUST	0.2					11,46	
		REPLACE		1.0				10,25,30, 33,50,53, 60,61,81	
		REPAIR		2.5				10,25,30, 33,50,53, 60,61,81	
	MAGNETIC CLUTCH ASSY	SERVICE	0.2					15	
		TEST		0.4				9,24,80	
		REPAIR		1.5				9,10,24, 57,62,71, 80	
	PILE LIFT CONTROL SWITCHES	TEST		0.8				10,13,46	
		ALINE		0.6				10,13,43	
		REPLACE		1.4				8,10,13, 50	
	PILE LIFT MOTORS	TEST		0.8				10,13,46	
		REPLACE		1.2				9,10,24, 49,57,62, 80	
		REPAIR		1.0			2.8	9,10,24, 49,57,62, 80	O,S

Section II. MAINTENANCE ALLOCATION CHART

NOMENCLATURE OF END ITEMS:

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			C	O	F	H	D		
15	COMPRESSOR	INSPECT	0.1						
		SERVICE	0.5						
		TEST		0.6				10,13,46	
		REPLACE		1.5				10,13,49, 50,59,79	
		REPAIR		0.8			8.0	10,13,49, 50,59,79	P,S
16	ELECTRICAL GROUP								
	MAIN CONTROL BOX	INSPECT		0.5					
		TEST		1.2				10,13,46	Q
		REPLACE					5.0		Q,S
		REPAIR		0.8			4.0	10,13	Q,R,S
	ELECTRONIC CONTROL BOX	INSPECT	0.2						
		TEST		0.4				10,46	
		REPLACE		0.5				10	
	AUXILLARY CONTROL BOXES	TEST		0.5				10,13,46	
		REPLACE		0.5				10,13	
		REPAIR		0.6				10,13	
17	CONTROL REGISTER SYSTEM	INSPECT		0.3					
		SERVICE		0.2					
		REPLACE		0.2					
		REPAIR		2.0				10,30,31, 80	

Section III. TOOL AND TEST EQUIPMENT REQUIREMENTS FOR TSS PRINTING PRESS

(1) Tool or test equipment ref code	(2) Maintenance category	(3) Nomenclature	(4) National/NATO stock number	(5) Tool number
1	C	Screwdriver, Flat-Tip, DIN 5265, 1.0 x 6.0 x 0.5 mm		00.540.003 (65713)
2	C	Wrench, Special		66.024.002 (65713)
3	C,O	Wrench, Pin		08.024.020 (65713)
4	O	Extractor Device		66.024.010 (65713)
5	C,O	Press, Ball Bearing Roller Core		66.024.013 (65713)
6	C	Gluing Device, Feeder Tape		66.173.471* (65713)
7	C,O	Wrench, Combination, 13 and 17 m		00.520.0785 (65713)
8	C	Key, Hex, 4 mm		00.520.0230 (65713)
9	C,O	Key, Hex, 5 mm		00.520.0231 (65713)
10	C,O,D	Screwdriver, Flat-Tip, 0.050 x 0.375 x 8 In.		UDS108 (65713)
11	C,O,D	Screwdriver, Flat-Tip, 0.46 x 0.3125 x 6 In.		UDS106 (65713)
12	C,O,D	Screwdriver, Cross-Tip, No. 3 x 6 In.		UDP163 (65713)
13	C,O	Screwdriver, Cross-Tip, No. 2 x 4 In.		UDP142 (65713)
14	C,O	Mallet, Rubber		BH232-2 (65713)

TOOL AND TEST EQUIPMENT REQUIREMENTS FOR TSS PRINTING PRESS (cont)

(1) Tool or test equipment ref code	(2) Maintenance category	(3) Nomenclature	(4) National/NATO stock number	(5) Tool number
15	C,O	Oil Can		03.024.062 (65713)
16	C,O	Grease Gun		04.024.061 (65713)
17	C,O,D	Gage, Slide		WLM22149 (65713)
18	O	Disc, Graduated		WLM22231 (65713)
19	C,O	Gage, Dial		WLM22753/1 (65713)
20	O	Blocks, Magnetic Measuring		WLM22753/2 (65713)
21	C,O	Gage, Linear		WLM22753/3 (65713)
22	C,O	Gun, Oil		03.024.062 (65713)
23	C	Wrench		66.024.015
24	C,O,D	Key, Hex, 5 mm, Long Handle		AWML5 (55719)
25	O,D	Key, Hex, 6 mm, Long Handle		AWML6 (55719)
26	C,O,D	Key, Hex, 8 mm, Long Handle		AWML8 (55719)
27	O,D	Key, Hex, 10 mm, Long Handle		AWML10 (55719)
28	O	Key, Hex, 12 mm, Long Handle		AWML12 (55719)
29	C,O,D	Driver Set, Bushing		A57QB (55719)
30	C,O,D	Hammer, Ball-Peen		BPN24B (55719)

TOOL AND TEST EQUIPMENT REQUIREMENTS FOR TSS PRINTING PRESS (cont)

(1) Tool or test equipment ref code	(2) Maintenance category	(3) Nomenclature	(4) National/NATO stock number	(5) Tool number
31	C,O,D	Punch, Pin, 2 mm		PPCM102 (55719)
32	C,O,D	Punch, Pin, 3 mm		PPCM103 (55719)
33	C,O,D	Punch, Pin, 4 mm		PPCM104 (55719)
34	C,O	Punch, Pin, 5 mm		PPCM105 (55719)
35	O,D	Punch, Pin, 6 mm		PPCM106 (55719)
36	O,D	Punch, Pin, 8 mm		PPCM108 (55719)
37	O,D	Punch, Bronze, 8 In.		PPC1001 (55719)
38	O	Punch, Bronze, 10 In.		PPC1002 (55719)
39	O	Housing, Stud Remover		CG500-2 (55719)
40	O	Collet, Stud Remover		CG500-30 (55719)
41	O	Collet, Stud Remover		CG500-42 (55719)
42	O	Collet, Stud Remover		CG500-48 (55719)
43	O,D	Gage, Feeler		FBM 321 (55719)
44		Deleted		
45	O,D	Mallet, Bronze		BE224 (55719)

TOOL AND TEST EQUIPMENT REQUIREMENTS FOR TSS PRINTING PRESS (cont)

(1) Tool or test equipment ref code	(2) Maintenance category	(3) Nomenclature	(4) National/NATO stock number	(5) Tool number
46	O,D	MULTIMETER,AN/PSN-45	6625-01-139-2512	T00377 (55026)
47	O	Wrench, Combination, 6 mm		OEXM6 (55719)
48	O,D	Wrench, Combination, 7 mm		OEXM7 (55719)
49	O	Wrench, Combination, 8 mm		OEXM8 (55719)
50	C,O,D	Wrench, Combination, 10 mm		OEXM10 (55719)
51	O	Wrench, Combination, 11 mm		OEXM11 (55719)
52		Deleted		
53	O,D	Wrench, Combination, 13 mm		OEXM13 (55719)
54	O	Wrench, Combination, 14 mm		OEXM14 (55719)
55	O	Wrench, Combination, 15 mm		OEXM15 (55719)
56	O	Wrench, Combination, 16 mm		OEXM16 (55719)
57	O,D	Wrench, Combination, 17 mm		OEXM17 (55719)
58	O	Wrench, Combination, 18 mm		OEXM18 (55719)
59	O,D	Wrench, Combination, 19 mm		OEXM19 (55719)
	O	Wrench Set, Combination, Long-Handle		OEXM721 (55719)
60	O	Wrench, Combination, 10 mm, Long-Handle		OEXM100 (55719)

TOOL AND TEST EQUIPMENT REQUIREMENTS FOR TSS PRINTING PRESS (cont)

(1) Tool or test equipment ref code	(2) Maintenance category	(3) Nomenclature	(4) National/NATO stock number	(5) Tool number
61	O,D	Wrench, Combination, 13 mm, Long-Handle		OEXM130 (55719)
62	O,D	Wrench, Combination, 17 mm, Long-Handle		OEXM170 (55719)
63	O,D	Wrench, Combination, 19 mm, Long-Handle		OEXM190 (55719)
64	O	Wrench, Combination, 22 mm, Long-Handle		OEXM220 (55719)
65	O	Wrench, Combination, 24 mm, Long-Handle		OEXM240 (55719)
66	O	Wrench, Combination, 27 mm, Long-Handle		OEXM270 (55719)
67	O	Wrench, Combination, 30 mm, Long-Handle		OEXM300 (55719)
68	O	Wrench, Combination, 32 mm, Long-Handle		OEXM320 (55719)
69	O,D	Puller, Three-Jaw		CG285 (55719)
70	O,D	Puller, Three-Jaw		CG273 (55719)
71	O,D	Pliers, Retaining-Ring		PR405 (55719)
72	O,D	Rule, Machinist's		GAM2 (55719)
73	O	Wrench, Torque		TER1A (55719)
74	O	Pliers, Combination		137 (55719)
75	O	Hacksaw		TBD
76	O	Chisel		PPC812A (55719)

TOOL AND TEST EQUIPMENT REQUIREMENTS FOR TSS PRINTING PRESS (cont)

(1) Tool or test equipment ref code	(2) Maintenance category	(3) Nomenclature	(4) National/NATC stock number	(5) Tool number
77	O,D	Wrench, Spanner		AFS484 (55719)
	O	Key, Hex, Set (Short Handle)		AWM110CK (55719)
78	O	Key, Hex, 2 mm		AWM2C (55719)
79	O,D	Key, Hex, 3 mm		AWM3C (55719)
80	O,D	Key, Hex, 5 mm		AWM5C (55719)
81	O,D	Key, Hex, 6 mm		AWM6C (55719)
82	O	Key, Hex, 7 mm		AWM7C (55719)
83	O,D	Key, Hex, 8 mm		AWM8C (55719)
84	O	Key, Hex 10 mm		AWM10C (55719)
85	O	Key, Hex, 11 mm		AWM11C (55719)
86	0	WRENCH,SPECIAL,V-SHAPE		66.024.018 (65713)
87	0	WRENCH,PIPE	5120-00-277-1462	PW24B (55719)
88	0	PULLER,PULLEY	5120-01-097-0696	GGG-P-781 TY7 SZ1 (80244)

Section IV. REMARKS

Reference Code	Remarks
A	Only repair is replacement of defective cap.
B	Adjustment to roller guide rails may be needed after replacement of ink roller(s).
C	Unit service consists of buffing scratches from the surface of the plate.
D	Replacement or repair of cover plate assembly should be done when needed to adjust side play of cylinder.
E	Adjustment may be made by adding or removing shims.
F	Repair consists of replacing starter and fluorescent lamp only.
G	Unit repair consists of replacement of gripper pads and pull rods only.
H	Unit repair consists of replacement of electromagnetic clutch only.
I	Unit repair limited to gripper pads and oil fitting replacement.
J	Perform safety test prior to operation.
K	Unit repair is limited to bearing assembly replacement.
L	Crew repair consists of replacing items commonly used during normal operation.
M	All internal suction head parts replaced by depot only.
N	Crew repair is limited to feeder tape replacement.
O	Unit repair to pile lift motors is limited to replacement of magnetic clutch.
P	All internal compressor parts replaced at depot.
Q	Disconnect power before working with electrical components.
R	Complete disassembly of main control box is limited to depot maintenance.
S	Use Hiedelberg commercial manual for depot repair.

APPENDIX C

EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

Section I. INTRODUCTION

C-1. Scope. This listing is for informational purposes only and is not authority to requisition the listed items. These items are authorized to you by CTA 50-970, Expendable/Durable Items (except medical, class V, repair parts, and heraldic items).

C-2. Explanation of Columns.

a. *Column (1) – Item Number.* This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material (e.g., "Use cleaning compound, item 5, appendix C)".

b. *Column (2) – Level.* This column identifies the lowest level of maintenance that requires the listed item.

C – Operator/Crew
O – Organizational Maintenance
F – Direct Support Maintenance
H – General Support Maintenance

c. *Column (3) – National Stock Number.* This is the National stock number assigned to the item; use it to request or requisition the item.

d. *Column (4) – Description.* Indicates the Federal item name, and, if required, a description to identify the item. The last line for each item indicates the Federal Supply Code for Manufacturer (FSCM) in parentheses followed by the part number.

e. *Column (5) – Unit of Measure (U/M).* Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., EA, IN., PR). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

Section II. EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

(1) Item number	(2) Level	(3) National stock number	(4) Description	(5) U/M
1		9150-01-086-4163	Grease, Multipurpose (54527) ALVANIA2	
2		9150-01-152-7060	Oil, General Purpose	GL
3		9510-00-153-0207	Oil, Machine, Light (81349) MIL-L-21260	GL
4		7920-00-148-9666	Rags, Wiping, Unbleached Cotton	
5		6850-00-205-6740	Solvent, Lithographic (09135) Solvent 95	GL

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Charts Transposed to

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Chief of Staff

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PAGE NO	PARA-GRAPH	FIGURE NO	TABLE NO	
6	2-1 a			In line 6 of paragraph 2-1a the manual states the engine has 6 Cylinders. The engine on my set only has 4 Cylinders. Change the manual to show 4 Cylinders.
81		4-3		Callout 16 on figure 4-3 is pointing at a bolt. In key to figure 4-3, item 16 is called a shim - Please correct one or the other.
125	line		20	I ordered a gasket, item 19 on figure B-16 by NSN 2910-00-762-3001. I got a gasket but it doesn't fit. Supply says I got what I ordered, so the NSN is wrong. Please give me a good NSN

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TEAR ALONG PERFORATED LINE

The Metric System and Equivalents

Linear Measure

1 centimeter = 10 millimeters = .39 inch
1 decimeter = 10 centimeters = 3.94 inches
1 meter = 10 decimeters = 39.37 inches
1 dekameter = 10 meters = 32.8 feet
1 hectometer = 10 dekameters = 328.08 feet
1 kilometer = 10 hectometers = 3,280.8 feet

Weights

1 centigram = 10 milligrams = .15 grain
1 decigram = 10 centigrams = 1.54 grains
1 gram = 10 decigram = .035 ounce
1 dekagram = 10 grams = .35 ounce
1 hectogram = 10 dekagrams = 3.52 ounces
1 kilogram = 10 hectograms = 2.2 pounds
1 quintal = 100 kilograms = 220.46 pounds
1 metric ton = 10 quintals = 1.1 short tons

Liquid Measure

1 centiliter = 10 milliters = .34 fl. ounce
1 deciliter = 10 centiliters = 3.38 fl. ounces
1 liter = 10 deciliters = 33.81 fl. ounces
1 dekaliter = 10 liters = 2.64 gallons
1 hectoliter = 10 dekaliters = 26.42 gallons
1 kiloliter = 10 hectoliters = 264.18 gallons

Square Measure

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch
1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches
1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet
1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet
1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres
1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch
1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches
1 cu. meter = 1000 cu. decimeters = 35.31 cu. feet

Approximate Conversion Factors

To change	*To*	*Multiply by*	*To change*	*To*	*Multiply by*
inches	centimeters	2.540	ounce-inches	newton-meters	.007062
feet	meters	.305	centimeters	inches	.394
yards	meters	.914	meters	feet	3.280
miles	kilometers	1.609	meters	yards	1.094
square inches	square centimeters	6.451	kilometers	miles	.621
square feet	square meters	.093	square centimeters	square inches	.155
square yards	square meters	.836	square meters	square feet	10.764
square miles	square kilometers	2.590	square meters	square yards	1.196
acres	square hectometers	.405	square kilometers	square miles	.386
cubic feet	cubic meters	.028	square hectometers	acres	2.471
cubic yards	cubic meters	.765	cubic meters	cubic feet	35.315
fluid ounces	milliliters	29,573	cubic meters	cubic yards	1.308
pints	liters	.473	milliliters	fluid ounces	.034
quarts	liters	.946	liters	pints	2.113
gallons	liters	3.785	liters	quarts	1.057
ounces	grams	28.349	liters	gallons	.264
pounds	kilograms	.454	grams	ounces	.035
short tons	metric tons	.907	kilograms	pounds	2.205
pound-feet	newton-meters	1.356	metric tons	short tons	1.102
pound-inches	newton-meters	.11296			

Temperature (Exact)

°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

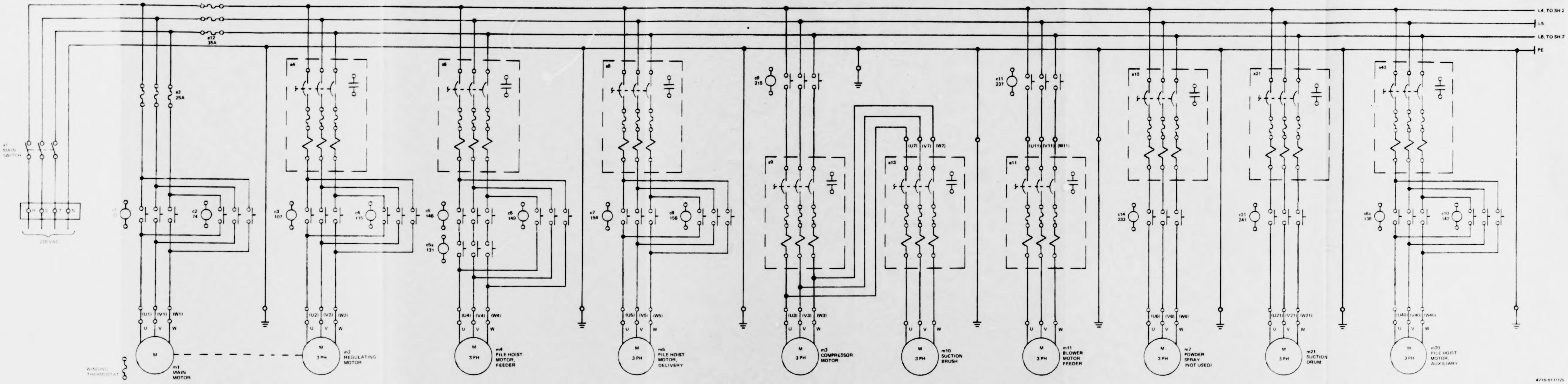
L4, TO SH 2
L5
L6, TO SH 2
PE
a1
MAIN
SWITCH
R S T N
220 VAC
e12
35A
e3
25A
c1
72
c2
74
e4
c3
107
c4
115
e6
c5
146
c5a
131
c6
149
e8
c7
154
c8
156
c9
215
e9
e13
(U7) (V7) (W7)
c11
237
e11
(U11) (V11) (W11)
e10
c14
233
e21
c21
241
e40
c8a
138
c10
142
(U1) (V1) (W1)
(U2) (V2) (W2)
(U4) (V4) (W4)
(U5) (V5) (W5)
(U3) (V3) (W3)
(U6) (V6) (W6)
(U21) (V21) (W21)
(U40) (V40) (W40)
U V W
M
3 PH
WINDING
THERMOSTAT
m1
MAIN
MOTOR
m2
REGULATING
MOTOR
m4
PILE HOIST
MOTOR,
FEEDER
m5
PILE HOIST
MOTOR,
DELIVERY
m3
COMPRESSOR
MOTOR
m10
SUCTION
BRUSH
m11
BLOWER
MOTOR
FEEDER
m7
POWDER
SPRAY
(NOT USED)
m21
SUCTION
DRUM
m20
PILE HOIST
MOTOR,
AUXILIARY
4710.017(1/6)

Figure FO-1. Electrical Schematic (Sheet 1 of 6).

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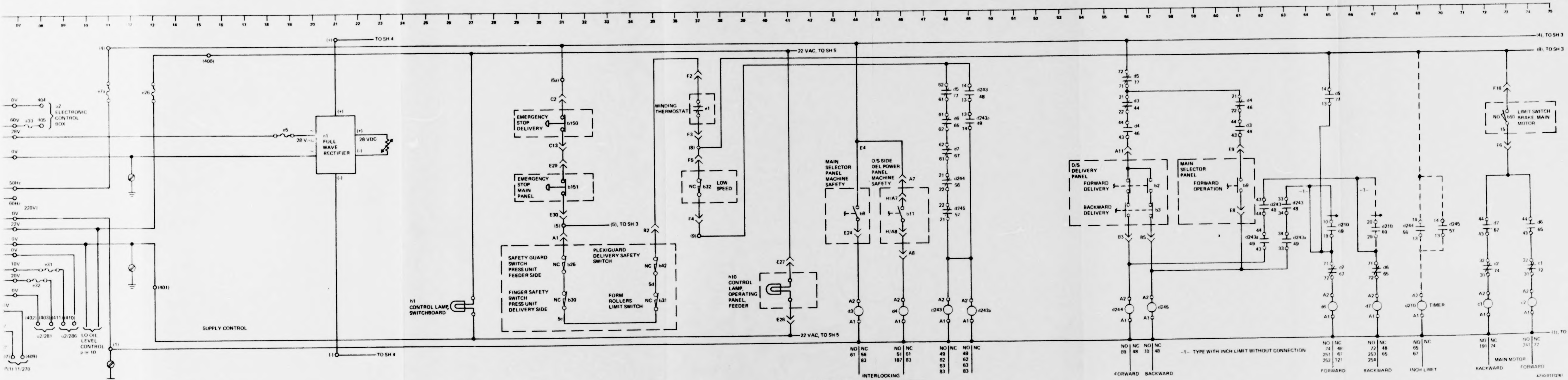
TO SH 4
(4)
(400)
e7a
e26
0V
404
u2
ELECTRONIC
CONTROL
BOX
60V
e33
105
28V
0V
50Hz
60Hz
220V1
0V
22V
0V
0V
10V
e31
20V
e32
0V
(402)
(403)
(411)
(410)
u2/281
u2/286
LO OIL
LEVEL
CONTROL
p nr 10
(409)
P(1) 11/270
(1)
e5
28 VAC
n1
FULL
WAVE
RECTIFIER
28 VDC
(+)
(-)
(401)
SUPPLY CONTROL
TO SH 4
h1
CONTROL LAMP,
SWITCHBOARD
(5a)
C2
EMERGENCY
STOP
DELIVERY
b150
C13
E29
EMERGENCY
STOP
MAIN
PANEL
b151
E30
(5)
(5), TO SH 3
A1
SAFETY GUARD
SWITCH
PRESS UNIT
FEEDER SIDE
NC b26
FINGER SAFETY
SWITCH
PRESS UNIT
DELIVERY SIDE
NC b30
5c
PLEXIGUARD
DELIVERY SAFETY
SWITCH
B2
NC b42
5d
FORM
ROLLERS
LIMIT SWITCH
NC b31
F2
WINDING
THERMOSTAT
e1
F3
(8)
F5
NC b32
LOW
SPEED
F4
(9)
22 VAC, TO SH 5
E27
h10
CONTROL
LAMP,
OPERATING
PANEL,
FEEDER
E26
22 VAC, TO SH 5
E4
MAIN
SELECTOR
PANEL
MACHINE
SAFETY
b8
E24
O/S SIDE
DEL POWER
PANEL
MACHINE
SAFETY
A7
H/A7
b11
H/A8
A8
d3
d4
d5
d6
d7
d244
d245
d243
d243a
INTERLOCKING
OPERATING PANEL, FEEDER
DELIVERY PANEL
A11
D/S
DELIVERY
PANEL
FORWARD
DELIVERY
b2
BACKWARD
DELIVERY
b3
B3
B5
MAIN
SELECTOR
PANEL
FORWARD
OPERATION
b9
E9
E8
d244
d245
FORWARD
BACKWARD
-1- TYPE WITH INCH LIMIT WITHOUT CONNECTION
d210
d6
d7
FORWARD
BACKWARD
d210
TIMER
INCH LIMIT
(4), TO SH 3
(8), TO SH 3
F16
NO b50
LIMIT SWITCH
BRAKE, MAIN
MOTOR
15
F6
c1
c2
MAIN MOTOR
BACKWARD
FORWARD
(1), TO SH 3
4710-017(2/6)

Figure FO-1. Electrical Schematic (Sheet 2 of 6).

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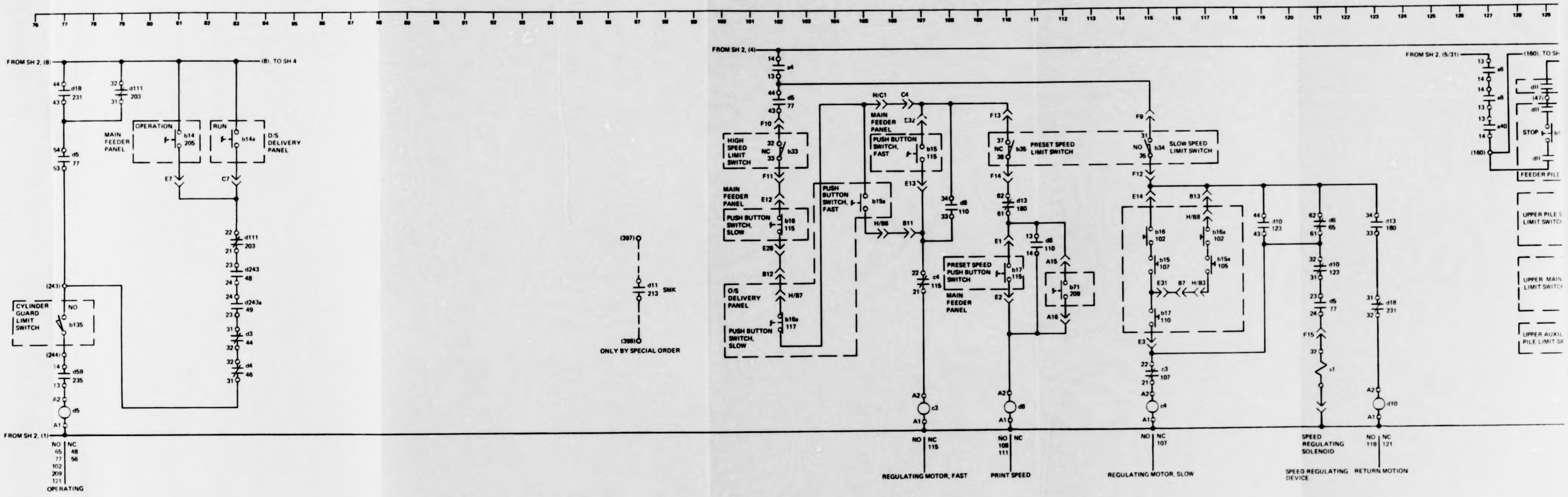
FROM SH 2, (8)
(8), TO SH 4
d18 231
d111 203
OPERATION
MAIN FEEDER PANEL
b14 205
RUN
b14a
D/S DELIVERY PANEL
E7
C7
d5 77
d111 203
d243 48
d243a 49
d3 44
d4 46
(243)
CYLINDER GUARD LIMIT SWITCH
NO
b135
(244)
d59 235
A2
d5
A1
FROM SH 2, (1)
NO NC
65 48
77 56
102
209
121
OPERATING
(397)
d11 213
SMK
(398)
ONLY BY SPECIAL ORDER
FROM SH 2, (4)
a4
d5 77
F10
HIGH SPEED LIMIT SWITCH
NC
b33
F11
MAIN FEEDER PANEL
E12
PUSH BUTTON SWITCH, SLOW
b16 115
E28
B12
O/S DELIVERY PANEL
H/B7
b16a 117
PUSH BUTTON SWITCH, SLOW
PUSH BUTTON SWITCH, FAST
b15a
H/B6
B11
H/C1
C4
MAIN FEEDER PANEL
E32
PUSH BUTTON SWITCH, FAST
b15 115
E13
d8 110
c4 115
A2
c3
A1
NO NC
115
REGULATING MOTOR, FAST
F13
NC
b35
PRESET SPEED LIMIT SWITCH
F14
d13 180
E1
d8 110
A15
PRESET SPEED PUSH BUTTON SWITCH
b17 115
MAIN FEEDER PANEL
E2
b71 209
A16
A2
d8
A1
NO NC
108
111
PRINT SPEED
F9
NO
b34
SLOW SPEED LIMIT SWITCH
F12
E14
B13
H/B8
b16 102
b16a 102
b15 107
b15a 105
E31
B7
H/B3
b17 110
E3
c3 107
A2
c4
A1
NO NC
107
REGULATING MOTOR, SLOW
d10 123
d6 65
d10 123
d5 77
F15
s1
SPEED REGULATING SOLENOID
SPEED REGULATING DEVICE
d13 180
d18 231
A2
d10
A1
NO NC
119 121
RETURN MOTION
FROM SH 2, (5/31)
a6
a8
a40
(160)
(160), TO SH
dII
(47)
STOP
FEEDER PILE
UPPER PILE S LIMIT SWITCH
UPPER MAIN LIMIT SWITCH
UPPER AUXIL PILE LIMIT SW

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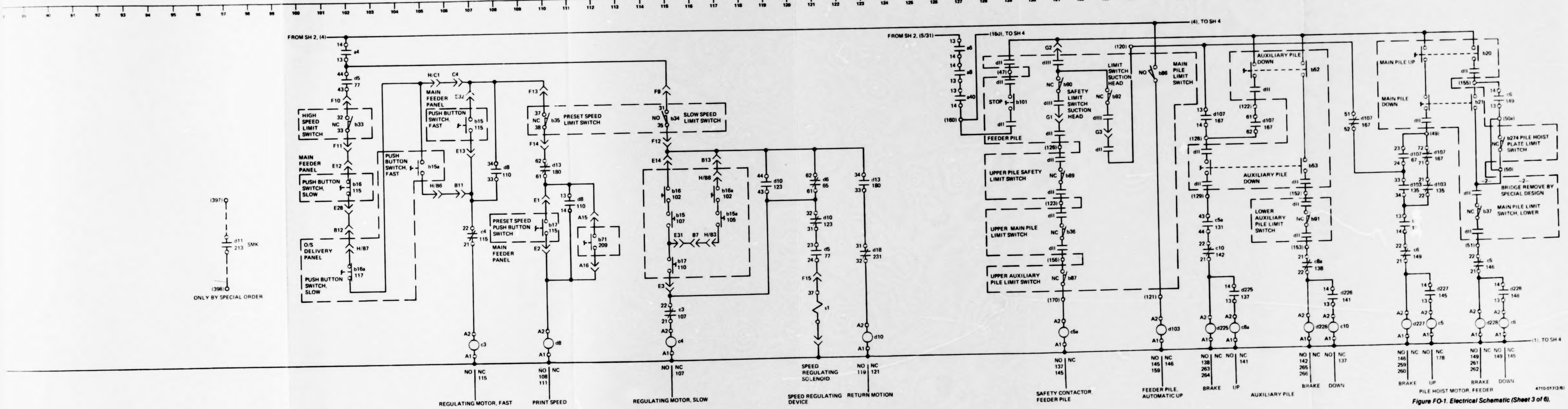
FROM SH 2, (4)
HIGH SPEED LIMIT SWITCH
b33
MAIN FEEDER PANEL
PUSH BUTTON SWITCH, SLOW
b16
O/S DELIVERY PANEL
PUSH BUTTON SWITCH, SLOW
b16a
PUSH BUTTON SWITCH, FAST
b15a
MAIN FEEDER PANEL
PUSH BUTTON SWITCH, FAST
b15
PRESET SPEED LIMIT SWITCH
b35
PRESET SPEED PUSH BUTTON SWITCH
b17
MAIN FEEDER PANEL
b71
SLOW SPEED LIMIT SWITCH
b34
(397)
d11 213
SMK
(398)
ONLY BY SPECIAL ORDER
REGULATING MOTOR, FAST
PRINT SPEED
REGULATING MOTOR, SLOW
SPEED REGULATING SOLENOID
SPEED REGULATING DEVICE
RETURN MOTION
FROM SH 2, (5/31)
(160), TO SH 4
(4), TO SH 4
STOP
b101
FEEDER PILE
SAFETY LIMIT SWITCH SUCTION HEAD
b90
LIMIT SWITCH SUCTION HEAD
b92
UPPER PILE SAFETY LIMIT SWITCH
b89
UPPER MAIN PILE LIMIT SWITCH
b36
UPPER AUXILIARY PILE LIMIT SWITCH
b87
MAIN PILE LIMIT SWITCH
b86
AUXILIARY PILE DOWN
b52
AUXILIARY PILE DOWN
b53
LOWER AUXILIARY PILE LIMIT SWITCH
b91
MAIN PILE UP
b20
MAIN PILE DOWN
b21
b274 PILE HOIST PLATE LIMIT SWITCH
BRIDGE REMOVE BY SPECIAL DESIGN
MAIN PILE LIMIT SWITCH, LOWER
b37
(1), TO SH 4
SAFETY CONTACTOR, FEEDER PILE
FEEDER PILE, AUTOMATIC UP
BRAKE
UP
AUXILIARY PILE
BRAKE
DOWN
BRAKE
UP
BRAKE
DOWN
PILE HOIST MOTOR, FEEDER
4710-017(3/6)

Figure FO-1. Electrical Schematic (Sheet 3 of 6).

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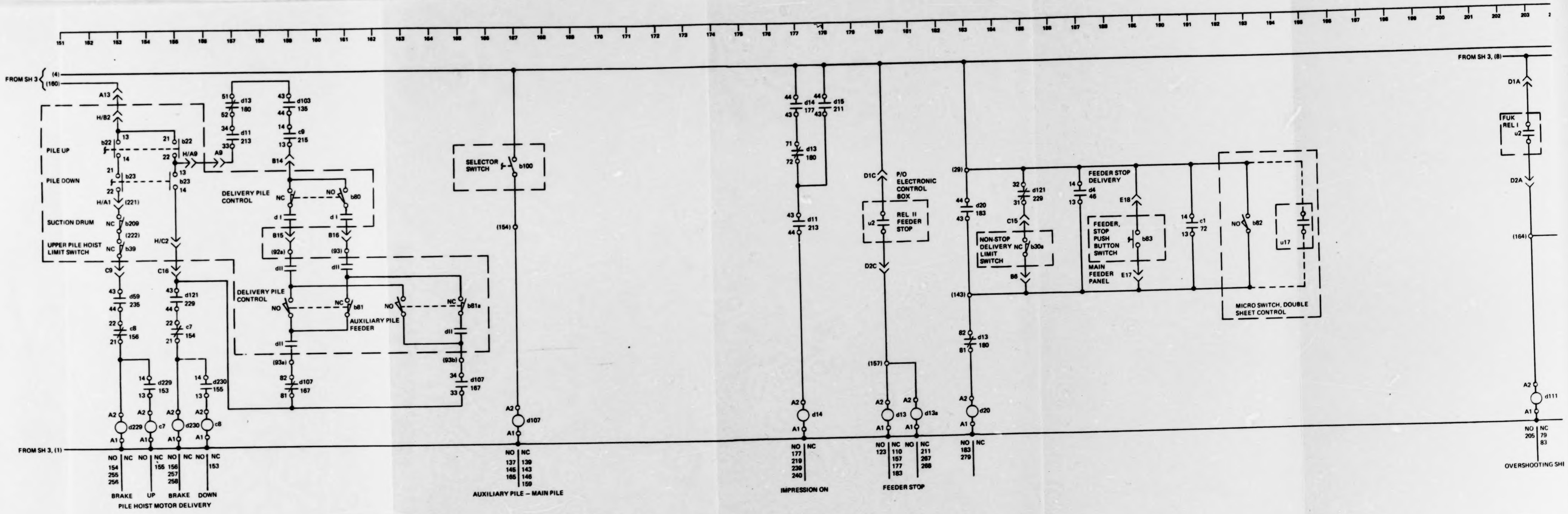

151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203
FROM SH 3 (4) (160)
A13
H/B2
PILE UP
b22
PILE DOWN
b23
H/A1 (221)
SUCTION DRUM
NC b209
(222)
UPPER PILE HOIST LIMIT SWITCH
NC b39
H/A9
A9
H/C2
C9
C16
d59 235
d121 229
c8 156
c7 154
d229 153
d230 155
d13 180
d11 213
d103 135
c9 215
B14
DELIVERY PILE CONTROL
NC
NO b80
d I
B15
B16
(92a)
(93)
dII
DELIVERY PILE CONTROL
NO
NC b81
NO
NC b81a
AUXILIARY PILE FEEDER
(93a)
(93b)
d107 167
d229
c7
d230
c8
FROM SH 3, (1)
NO NC 154 255 256
NO NC 155
NO NC 156 257 258
NO NC 153
BRAKE
UP
BRAKE
DOWN
PILE HOIST MOTOR DELIVERY
SELECTOR SWITCH
b100
(154)
d107
NO NC 137 145 165 | 139 143 146 159
AUXILIARY PILE – MAIN PILE
d14 177
d15 211
d13 180
d11 213
d14
NO NC 177 219 239 240
IMPRESSION ON
D1C
P/O ELECTRONIC CONTROL BOX
u2
REL II FEEDER STOP
D2C
(157)
d13
d13a
NO NC 123 | 110 157 177 183
NO NC 211 267 268
FEEDER STOP
(29)
d20 183
d121 229
C15
NON-STOP DELIVERY LIMIT SWITCH
NC b30a
B6
FEEDER STOP DELIVERY
d4 46
E18
FEEDER, STOP PUSH BUTTON SWITCH
b83
MAIN FEEDER PANEL
E17
c1 72
NO b82
u17
MICRO SWITCH, DOUBLE SHEET CONTROL
(143)
d13 180
d20
NO NC 183 279
FROM SH 3, (8)
D1A
FUK REL I
u2
D2A
(164)
d111
NO NC 205 | 79 83
OVERSHOOTING SHI

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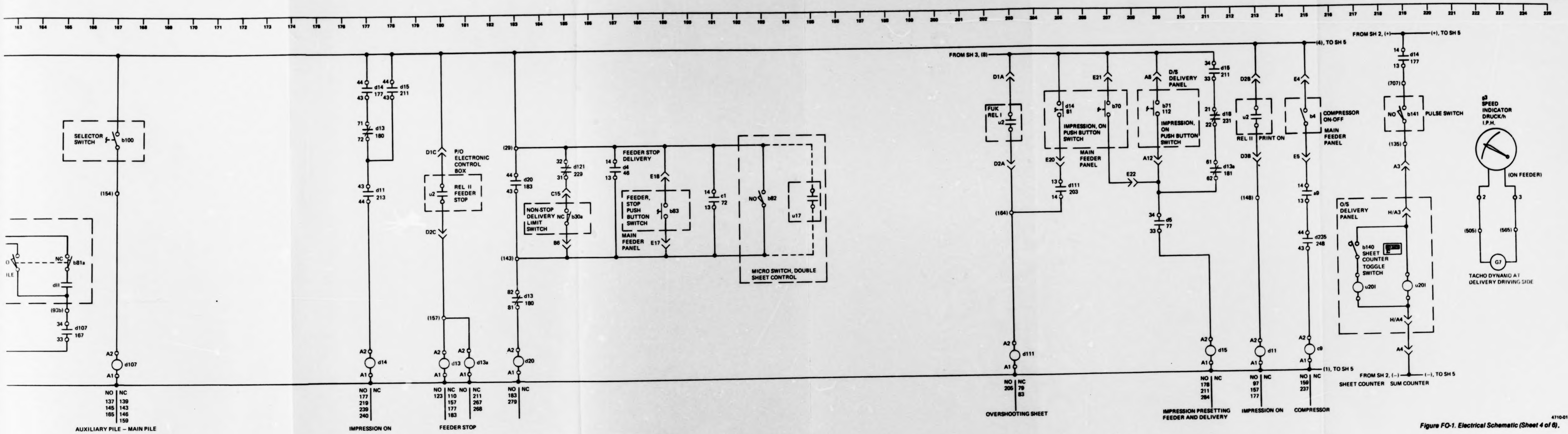
163
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218
219
220
221
222
223
224
225
SELECTOR SWITCH
b100
(154)
NC
b81a
ILE
d11
(93b)
34
d107
167
33
A2
d107
A1
NO | NC
137 145 165 | 139 143 146 159
AUXILIARY PILE – MAIN PILE
44 d14 177 43
44 d15 211 43
71 d13 180 72
43 d11 213 44
A2 d14 A1
NO | NC
177 219 239 240 |
IMPRESSION ON
D1C
P/O ELECTRONIC CONTROL BOX
u2
REL II FEEDER STOP
D2C
(157)
A2 d13 A1
A2 d13a A1
NO | NC
123 | 110 157 177 183
NO | NC
| 211 267 268
FEEDER STOP
(29)
44 d20 183 43
(143)
82 d13 180 81
A2 d20 A1
NO | NC
183 279 |
32 d121 229 31
C15
NON-STOP DELIVERY LIMIT SWITCH
NC b30a
B6
14 d4 46 13
FEEDER STOP DELIVERY
E18
FEEDER, STOP PUSH BUTTON SWITCH
b83
MAIN FEEDER PANEL
E17
14 c1 72 13
NO b82
u17
MICRO SWITCH, DOUBLE SHEET CONTROL
FROM SH 3, (8)
D1A
FUK REL I
u2
D2A
(164)
A2 d111 A1
NO | NC
205 | 79 83
OVERSHOOTING SHEET
d14 81
b70
IMPRESSION, ON PUSH BUTTON SWITCH
E20
E21
MAIN FEEDER PANEL
13 d111 203 14
E22
A5
D/S DELIVERY PANEL
b71 112
IMPRESSION, ON PUSH BUTTON SWITCH
A12
34 d5 77 33
34 d15 211 33
21 d18 231 22
61 d13a 181 62
A2 d15 A1
NO | NC
178 211 284 |
IMPRESSION PRESETTING FEEDER AND DELIVERY
(4), TO SH 5
D2B
u2
REL II
PRINT ON
D3B
(148)
A2 d11 A1
NO | NC
97 157 177 |
IMPRESSION ON
E4
b4
COMPRESSOR ON-OFF
MAIN FEEDER PANEL
E5
14 a9 13
44 d235 248 43
A2 c9 A1
(1), TO SH 5
NO | NC
159 237 |
COMPRESSOR
FROM SH 2, (+)
(+), TO SH 5
14 d14 177 13
(707)
NO b141
PULSE SWITCH
(135)
A3
O/S DELIVERY PANEL
H/A3
b140 SHEET COUNTER TOGGLE SWITCH
u201
u201
H/A4
A4
FROM SH 2, (–)
(–), TO SH 5
SHEET COUNTER
SUM COUNTER
g3 SPEED INDICATOR DRUCK/h I.P.H.
(ON FEEDER)
2
3
(505)
(565)
G7
TACHO DYNAMO AT DELIVERY DRIVING SIDE

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Figure FO-1. Electrical Schematic (Sheet 4 of 6).

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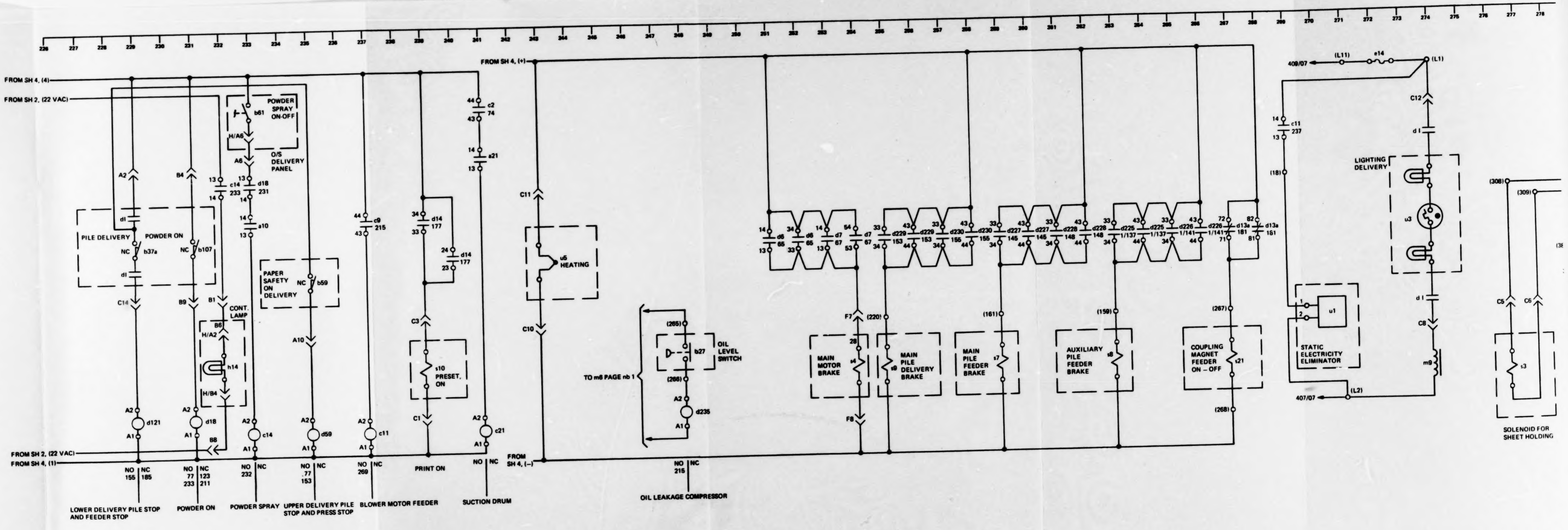
226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278
FROM SH 4, (4)
FROM SH 2, (22 VAC)
PILE DELIVERY
POWDER ON
NC b37a
NC b107
dI
A2
B4
C14
B9
B1
CONT. LAMP
B6
H/A2
h14
H/B4
B8
POWDER SPRAY ON-OFF
b61
H/A6
A6
O/S DELIVERY PANEL
c14 233
d18 231
a10
PAPER SAFETY ON DELIVERY
NC b59
A10
c9 215
d14 177
C3
s10 PRESET, ON
C1
c2 74
a21
d121
d18
c14
d59
c11
c21
A1
FROM SH 2, (22 VAC)
FROM SH 4, (1)
NO 155 | NC 185
NO 77 233 | NC 123 211
NO 232 | NC
NO .77 153 | NC
NO 269 | NC
NO | NC
LOWER DELIVERY PILE STOP AND FEEDER STOP
POWDER ON
POWDER SPRAY
UPPER DELIVERY PILE STOP AND PRESS STOP
BLOWER MOTOR FEEDER
PRINT ON
SUCTION DRUM
FROM SH 4, (+)
FROM SH 4, (–)
C11
u5 HEATING
C10
(265)
b27
OIL LEVEL SWITCH
TO m8 PAGE nb 1
(266)
d235
NO 215 | NC
OIL LEAKAGE COMPRESSOR
d6 65
d7 67
d229 153
d230 155
d227 145
d228 148
d225 1/137
d226 1/141
d13a 181
F7
(220)
(161)
(159)
(267)
(268)
28
F8
MAIN MOTOR BRAKE
s4
MAIN PILE DELIVERY BRAKE
s9
MAIN PILE FEEDER BRAKE
s7
AUXILIARY PILE FEEDER BRAKE
s8
COUPLING MAGNET FEEDER ON – OFF
s21
409/07
(L11)
e14
(L1)
C12
c11 237
(18)
LIGHTING DELIVERY
u3
u1
STATIC ELECTRICITY ELIMINATOR
C8
m9
407/07
(L2)
(308)
(309)
C5
C6
s3
SOLENOID FOR SHEET HOLDING

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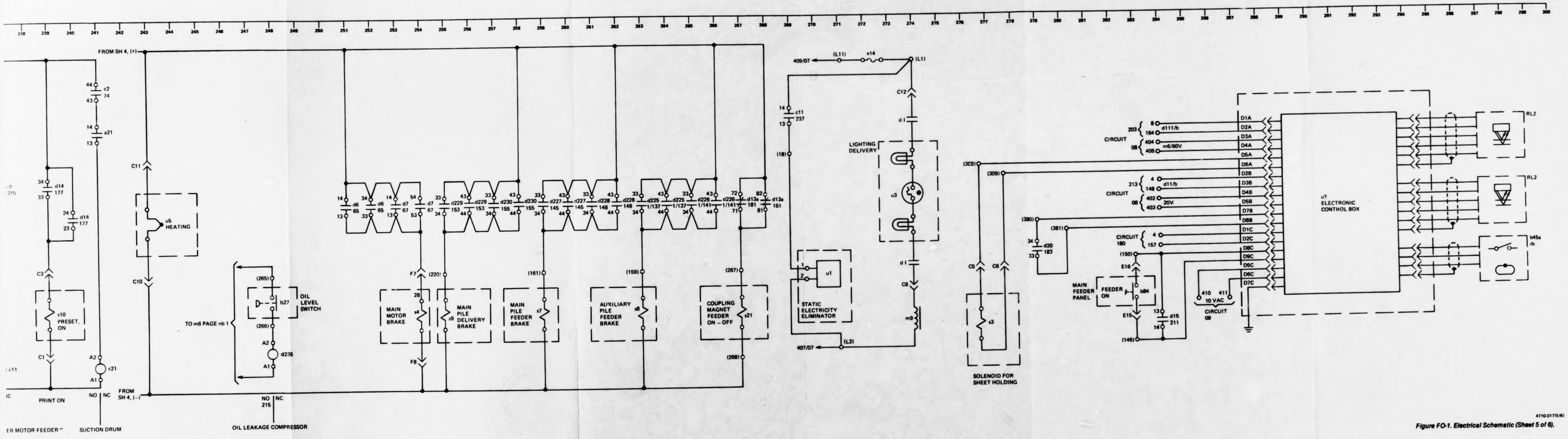
FROM SH 4, (+)
FROM SH 4, (–)
u5 HEATING
OIL LEVEL SWITCH
TO m6 PAGE nb 1
OIL LEAKAGE COMPRESSOR
s10 PRESET, ON
PRINT ON
SUCTION DRUM
ER MOTOR FEEDER
MAIN MOTOR BRAKE
MAIN PILE DELIVERY BRAKE
MAIN PILE FEEDER BRAKE
AUXILIARY PILE FEEDER BRAKE
COUPLING MAGNET FEEDER ON – OFF
STATIC ELECTRICITY ELIMINATOR
LIGHTING DELIVERY
SOLENOID FOR SHEET HOLDING
MAIN FEEDER PANEL
FEEDER ON
CIRCUIT
10 VAC
u7 ELECTRONIC CONTROL BOX
RL2

4710-017(5/6)

Figure FO-1. Electrical Schematic (Sheet 5 of 6).

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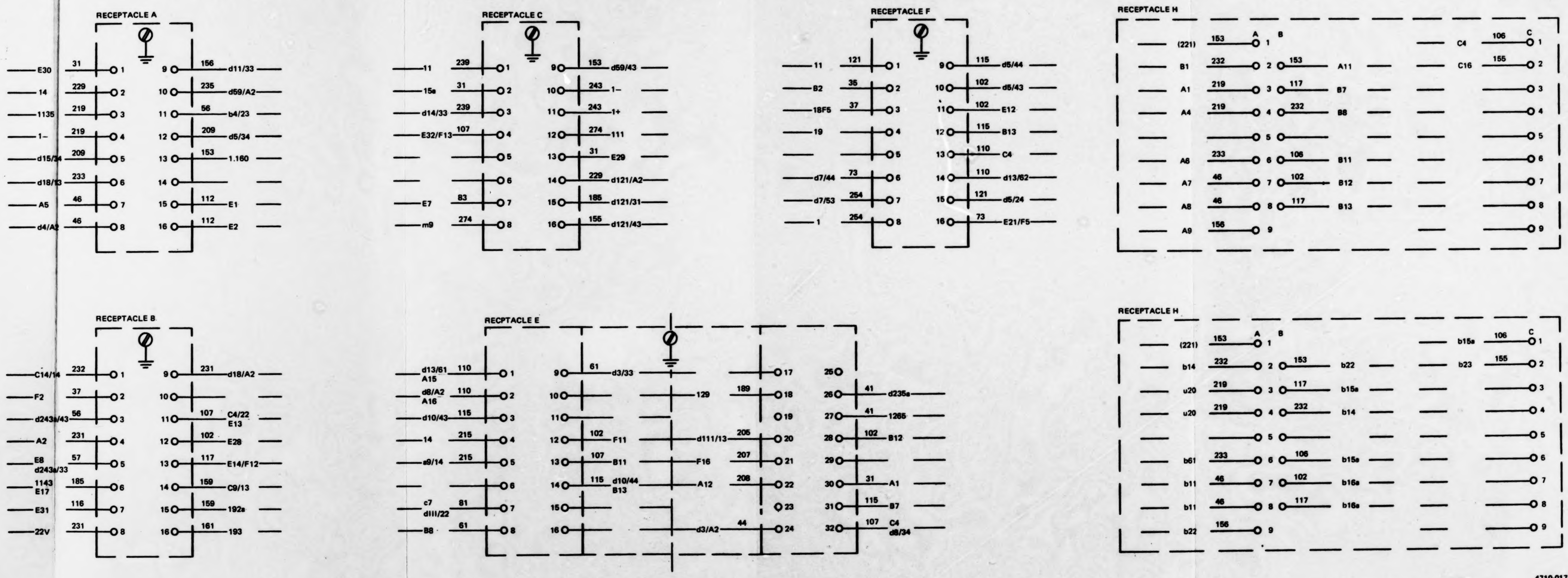
RECEPTACLE A
RECEPTACLE C
RECEPTACLE F
RECEPTACLE H
RECEPTACLE B
RECPTACLE E
RECEPTACLE H

4710-017(6/6)

Figure FO-1. Electrical Schematic (Sheet 6 of 6).

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